Deborah A. Sivas (Calif. Bar No. 135446)
Leah J. Russin (Calif. Bar No. 225336)
Carolyn Bills (Certified Law Student)
Edmund J. Gorman, Jr. (Certified Law Student)
ENVIRONMENTAL LAW CLINIC
Mills Legal Clinic at Stanford Law School
Crown Quadrangle
559 Nathan Abbott Way
Stanford, California 94305
Telephone: (650) 725-8571
Facsimile: (650) 723-4426
dsivas@stanford.edu
leahrussin@law.stanford.edu

Andrea A. Treece (Calif. Bar No. 237639)
CENTER FOR BIOLOGICAL DIVERSITY
1095 Market Street Suite 511
San Francisco, California
Telephone: (415) 436-9682
Facsimile: (415) 436-9683
atreece@biologicaldiversity.org

Attorneys for Plaintiff Center for Biological Diversity

UNITED STATES DISTRICT COURT

FOR THE NORTHERN DISTRICT OF CALIFORNIA

SAN FRANCISCO DIVISION

CENTER FOR BIOLOGICAL DIVERSITY, a non-profit corporation, Plaintiff, v. MICHAEL CHERTOFF, in his official capacity as Secretary of the U.S. Department of Homeland Security, REAR ADMIRAL PAUL F. ZUKUNFT, in his official capacity as Commander of U.S. Coast Guard District Eleven, and UNITED STATES COAST GUARD, Defendants.	Case No. 08-CV-02999 MMC **DECLARATION OF ANDREA A. TREECE IN SUPPORT PLAINTIFF'S MOTION FOR SUMMARY JUDGMENT** **Date:** October 3, 2008 **Time:** 9:00 a.m. **Judge:** Hon. Maxine Chesney **Courtroom:** Ctrm. 7, 19th Flr.

I, Andrea A. Treece, declare as follows:

1. I offer this declaration in support of Plaintiff's Motion for Summary Judgment. The matters set forth herein are stated upon my personal knowledge, and if called upon to testify, I could and would testify competently as to them.

2. I am a senior attorney with the Plaintiff, Center for Biological Diversity. I am an attorney admitted to practice in this court.

3. Attached as Exhibit A to this declaration is a true and correct copy of a National Marine Fisheries Service ("NMFS") Technical Memorandum titled "Large Whale Ship Strike Database" by A.S. Jensen and G.K. Silber, NMFS Office of Protected Resources, dated January 2004, which I obtained at http://www.nmfs.noaa.gov/pr/pdfs/shipstrike/lwssdata.pdf.

4. Attached as Exhibit B is a true and correct copy of NMFS's Stock Assessment for the Blue Whale Eastern North Pacific Stock, dated October 30, 2007, which I obtained at http://www.nmfs.noaa.gov/pr/pdfs/sars/po2007whbl-en.pdf.

5. Attached as Exhibit C is a true and correct copy of NMFS's August 18, 2004 white paper entitled "Large Whale Ship Strikes Relative to Speed," which I obtained at http://www.nero.noaa.gov/shipstrike/news/white_paper_Speed_18Aug_2004.pdf.

6. Attached as Exhibit D is true and correct copy of the NMFS Recovery Plan for the Blue Whale (*Baleanoptera musculus*), dated July 1998, which I obtained at http://www.nmfs.noaa.gov/pr/pdfs/recovery/whale_blue.pdf.

7. Attached as Exhibit E is a true and correct copy of NMFS's Stock Assessment Report for Eastern North Pacific Stock of Humpback Whales (*Megaptera novaeangliae*), dated November 1, 2005, which I obtained at http://www.nmfs.noaa.gov/pr/pdfs/sars/po2005whhb-en.pdf.

8. Attached as Exhibit F is a true and correct copy of the American Association of Port Authorities' World Port Rankings for 2005, which I obtained at http://aapa.files.cms-plus.com/Statistics/WORLD%20PORT%20RANKINGS%202005.xls.

9. Attached as Exhibit G is a true and correct copy of the U.S. Coast Guard's Sector San Francisco Vessel Traffic Service User's Manual, dated March 2005, which I obtained at

http://www.uscg.mil/D11/vtssf/vtssfum.asp.

10. Attached as Exhibit H is a true and correct copy of a "Local Notice to Mariners," dated October 31, 2007, in which the Coast Guard advised shipping traffic of hazards and directed shipping traffic during the 44th week of 2007, which I obtained by downloading the zip file for D11 in archives available at http://www.navcen.uscg.gov/archives/lnm/lnm2007/.

11. Attached as Exhibit I is a true and correct copy of a "Local Notice to Mariners," dated August 6, 2008, in which the Coast Guard advised vessel operators of hazards and directed shipping traffic during the 32nd week of 2008, which I obtained by downloading the zip file for D11 in archives available at http://www.navcen.uscg.gov/lnm/d11/default.htm.

12. I declare under penalty of perjury that the foregoing is true and correct and that this Declaration was executed on August 26, 2008, at San Francisco, California.

/s/ Andrea A. Treece
Andrea A. Treece

Exhibit A

Exhibit A

Large Whale Ship Strike Database

Aleria S. Jensen and Gregory K. Silber
Office of Protected Resources
National Marine Fisheries Service
Silver Spring, Maryland

Contributors: John Calambokidis, Cathy Campbell, Joe Cordaro, Ray Deiter, Margaret Akamine, Connie Ewald, Dave Flannagan, John Ford, Pat Gerrior, Joseph Green, Frances Gulland, Diana Gutierrez, Michael Henshaw, John E. Heyning, T.E. Lawlor, T.D. Lewis, Jenny Litz, William McClellan, Richard Merrick, Brent Norberg, Daniel K. Odell, D. Jeffrey Passer, Nancy Read, Lloyd Richards, Teri Rowles, Ray Sautter, and Charles D. Woodhouse

U.S. Department of Commerce
National Oceanic and Atmospheric Administration
National Marine Fisheries Service

NOAA Technical Memorandum NMFS-OPR-25
January 2004

Acknowledgments

We recognize the work of those in the field, notably members of the marine mammal stranding network, some of whom are listed on the first page. Much information on ship strikes to large whales would not be available were it not for the dedication and expertise of those who assess the condition of stranded and floating dead animals and maintain these data. Our appreciation also to the efforts of the many NOAA Fisheries staff who searched out ship strike records in response to a request for data. David Laist and colleagues' Marine Mammal Science paper on collisions between whales and ships was an invaluable source for ship strike records and provided a significant portion of reports in this database, as was the work by Peter Best and others on the same subject. Finally, the authors recognize those conscientious mariners who willingly report strike occurrences and communicate the details of such incidents to marine mammal protection agencies and organizations. Donna Wieting encouraged us to undertake this work and helped provide the time for us to complete it.

Literature citation should read as follows:

Jensen, A.S. and G.K. Silber. 2003. Large Whale Ship Strike Database. U.S. Department of Commerce, NOAA Technical Memorandum. NMFS-OPR- , 37 pp.

Additional copies may be obtained from:

National Marine Fisheries Service
Office of Protected Resources
1315 East-West Highway, 13th Floor
Silver Spring, MD 20910
301-713-2322

This document can also be downloaded from NMFS website:
http://www.nmfs.noaa.gov/pr/overview/publicat.html

Introduction

Some human-related threats to endangered large whale species are diminishing, and a number of large whale populations are increasing in abundance. However, injuries and deaths resulting from ship collisions with whales remain a significant threat. In North Atlantic right whales, for example, ship strikes are a primary culprit in the slowed recovery of a highly depleted population.

Several papers provide accounts of mortality in large whales due to ship strikes (Laist et al., 2001; Best et al., 2001; Knowlton and Kraus, 2001). These papers review ship strike records through 2000, 1997 and 1999, respectively. We have built on these accounts by assembling a data base of all known ship strikes worldwide through 2002; a number of our records do not appear in previous accounts. Likely, many ship strikes go undetected or unreported as they may occur in remote areas or struck whales may drift out to sea. Thus, the actual number of strikes is undoubtedly much greater than reported here. Nonetheless, the information we provide is, to our knowledge, the most comprehensive set of data to date on this subject. In the geographic scope and in the range of species effected, the data base illustrates the extent of the threat to large whale species.

The intention of this report is to make accessible the known information on ship strikes to large whales world-wide. We have not attempted to provide an extensive analysis of such records herein, as a thorough discussion of a number of these records can be found in Laist et al. (2001). Rather, we have synthesized ship strike reports to large whales into a comprehensive database to centralize the knowledge base of such incidents. These records indicate that collisions between whales and ships are a world-wide phenomenon which warrants attention.

Materials and Methods

This database is based on a public request for information that NOAA Fisheries received for large whale ship strike records from 1975 to present (2002). Agency staff from NOAA Fisheries' Northeast, Southeast, Northwest, Southwest, Alaska, and Hawaii Fisheries Science Centers and Regional Offices contributed records to this report. In addition, NOAA Fisheries Office of Law Enforcement regional offices provided records of ship strike based on agency investigations (pending cases excluded). Many agency staff worked to the best of their abilities to fulfill this request, but it is possible that some records were overlooked and thus are not included.

In compiling this database, records of ship strikes were drawn from ship reports, marine mammal stranding reports, and NOAA Office of Law Enforcement reports. Following the initial set of data received, additional ship strike records were sought for the purposes of this synthesis through personal communications and a review of the literature on this issue (in particular, Laist et al., 2001; Best et al., 2001). Our records include information through October 2002.

Direct reports from ships, crew and captains are the most reliable source of information on an actual ship strike incident. In these cases, wherein the ship's crew was aware of

the strike, it is often possible to obtain information on ship speed, damage to a ship, and relative degree of severity of the strike to the animal. Ship strike information can also be determined from stranded or floating dead whales in which definitive evidence of a massive internal or external trauma is documented (i.e., lacerations from propellers, fractures, hemorrhaging). However, these data are not always definitive as to whether the strike occurred pre- or post-mortem. In such cases, there generally is no information on how, when, or where the strike actually occurred. A dead stranded whale may drift considerable distance from the site of the actual impact. In the absence of a confirmed location for a ship strike incident, we have listed the site of stranding or site of discovery of the floating animal as the collision location in our database.

Another type of record is the occurrence of a ship entering port with a whale carcass draped across its bow. Generally, in these instances the ship's crew was unaware of the strike. Most often this occurs with large container, tanker and cruise ships, and a collision is only determined after the event when the whale is noticed pinned to a ship's bow by a pilot boarding the vessel or lookouts posted for harbor entry. In 42 of the known or probable cases of ship strike in our database, evidence of a collision was only noticed when a whale was brought into harbor on the bow of a large vessel. In certain rare instances, time and location of impact can be estimated by back-calculating to correlate with a previously unexplained decrease in vessel speed.

Given that crew of large vessels often do not detect the impact of striking a whale, animals may be hit and passed over without observation. Likewise, operators may be aware of a strike but choose not to report it. Therefore, as noted above, it is likely that far more collisions actually have occurred than the number reported here.

For the purposes of this report, evidence of injury or mortality is defined as blood noted in water; animal seen with cuts, propeller gashes or severed tailstock; animal observed sinking after strike indicating death; fractured skull, jaw, vertebrae; hemorrhaging, massive bruising or other injuries noted during necropsy of animal.

Results

The data base contains a total of 292 records of confirmed or possible ship strikes to large whales (Table 1). Where available, we have noted ancillary information such as vessel type, extent of injury, and vessel speed at time of impact.

Ship Strikes by Species

Eleven species were confirmed victims of ship strikes: blue, Bryde's, finback, gray, humpback, killer, minke, North Atlantic right, sei, southern right, and sperm whales (Figure 1). Finback whales are the most often reported species hit (75 records of strike), followed by humpback (44 records), North Atlantic right (38 records), gray (24 records), minke (19 records), southern right (15 records), and sperm whales (17 records). Far fewer reports exist of strikes to blue (8 records), Bryde's (3 records), sei (3 records) and killer whales (1 record). Several collision incidents were identified as general balaenopterid (3 records of strike), while a large proportion of reported strikes were not identified to species (42 unknown records). We note that coastal species (e.g., right and humpback whales) may be over represented in our data base, due to a greater likelihood of near-shore detection of a ship struck carcass than individuals that may have died

at great distances from shore.

Geographic Distribution of Strikes

Ship strikes to large whales occur world-wide. In our records (and those compiled by others), large whale ship strikes were recorded in waters off Antarctica, Australia, Brazil, Canada, the Canary Islands, France, Japan, Mexico, New Zealand, Panama, Peru, Puerto Rico, and South Africa; in the Caribbean, Mediterranean, and Yellow Seas; and in the Indian and South Pacific Oceans. Our records indicate that ship strikes are most common in North America (Figure 2), but this is almost certainly biased due to sources of data from North American stranding records and enforcement reports. This finding may also be related to the volume of ship traffic along North American coasts. Furthermore, our (the authors) northern hemisphere location increases the likelihood that we learn of reports from North America more readily than elsewhere.

Collision incidents in waters off the United States are recorded from almost every coastal state: Alaska, California, Delaware, Florida, Georgia, Hawaii, Maine, Maryland, Massachusetts, New Jersey, New York, North Carolina, Oregon, Rhode Island, South Carolina, Texas, Virginia, and Washington. Collisions also occurred in three National Marine Sanctuaries (NMS): Stellwagen Bank NMS (humpback, fin, and right whales), Channel Islands NMS (gray and several unidentified whales), and the Hawaiian Islands Humpback Whale NMS (humpback whales).

Records indicate that collisions between vessels and whales in U.S. waters are most common along the east coast, followed by the west coast and Alaska/Hawaii (Figure 3). Collisions were least common in the Gulf of Mexico.

Severity of Strike

Of the total 292 large whale ship strike reports, 48 (16.4%) resulted in injury to the animal and 198 (68.0%) were fatal. Thus, a total of 246 (84.3%) records indicate that whales that were hit or bear evidence of ship strike were in fact injured or killed by the interaction (Figure 4). In most cases the fate of injured whales is not known. Additionally, in 39 collision reports (13.3%), the impact to the whale was unknown, while in 7 reports (2.4%) there appeared to be no sign of injury.

It should be noted that the high injury and mortality figures for all whales in the database include numerous records of stranded or floating animals found dead. Injuries on a whale's dorsal side indicate that the animal was alive when hit, as dead whales generally float belly-up and are thus more likely to be injured ventrally if hit post-mortem. Although strong evidence indicates ship strike in the records included in this database (i.e., propeller marks, bruises, fractures, hemorrhaging, severed flukes), fatalities due to ship strike cannot always be confirmed because it is difficult or impossible to determine in some of these cases whether the strike occurred to the animal pre- or post-mortem. In addition, because many of our records come from dead stranded whales (as opposed to reports from mariners involved in or observing the striking), the database is weighted toward ship strikes resulting in death.

Vessel Type

Collisions between ships and whales are associated with a wide variety of vessel types. From our database, 134 of 292 cases of ship strike include information on vessel type, while in 158 cases the type of ship was

unknown. Of the 134 cases of known vessel type, there are 23 reported incidents (17.1%) of Navy vessels hitting whales, 20 reports (14.9%) of ship strike for container/cargo ships/freighters, 19 (14.2%) reports of ship strike for whale-watching vessels, and 17 reports (12.7%) for cruise ships/liners (Figure 5). Sixteen reports of ship strike (11.9%) are attributed to ferries. Nine cases of ship strike (6.7%) are reported for Coast Guard vessels and eight cases (6.0%) for tankers. Recreational vessels and steamships were each responsible for seven collisions (5.2%) in the database, while fishing vessels were responsible for four records (3.0%) of strike. One collision (0.75 %) was reported from each of the following: dredge boat, research vessel, pilot boat, and whaling catcher boat.

Although these data provide valuable information regarding the wide range of vessels involved in collisions, care should be taken in interpreting these numbers. As noted earlier, captains of large ships, such as container ships, tankers, and cruise ships may not be aware that a collision with a whale has occurred and thus do not report the incident. It is also likely that captains of ships of all sizes who are under no obligation to report, in fact, do not, out of apathy or fear of enforcement consequences.

It should be carefully noted that the relatively high incidence of Navy and Coast Guard collision reports may be largely a factor of standardized military and government reporting practice rather than an actual higher frequency of collisions relative to other ship types. These two federal agencies are actively involved in large whale protection programs and reporting struck or dead whales to the National Marine Fisheries Service is now a part of standard operating practices.

Ship Speed

Vessel speed at the time of strike was reported for 58 (19.8%) of the 292 cases in our database (Figure 6). The range of speeds at which vessels were operating when a whale was hit was 2–51 knots; and the mean speed was 18.1 knots. The mean vessel speed which resulted in injury or mortality to the whale was 18.6 knots. Of the 58 cases, 19 (32.8%) resulted in injury to the whale and 20 (34.5%) resulted in mortality. Thus, a total of 39 incidents of ship strike (67.2%) with speed associated are known to have resulted in injury or mortality to the animal. When all 58 reports are grouped by speed, most vessels were traveling in the ranges of 13–15 knots, followed by speed ranges of 16–18 knots and 22-24 knots.

Vessel Damage and Mariner Safety

Thirteen records indicate damage to the vessel (as reported by the vessel), ranging from minor to extreme, as a result of impact with a whale. All of the incidents of vessel damage for which speeds were recorded were from collisions at an operating speed equal to or greater than 10 knots.

Many of these ships report cracked hulls or damaged propellers, propeller shafts and rudders. In one case, an 8 m recreational Bayliner traveling at 12 knots cracked its hull when it hit a humpback whale outside Juneau, Alaska. A 126 m Navy vessel sustained a 1.6 m tear in the leading edge of a propeller blade when it struck an undetermined whale species off southern California. By far the most extreme example was that of a 24 m high-speed Navy vessel, which hit an undetermined whale species at a speed over 40 knots off Key West, Florida, and reported severely damaged port and starboard aft strut actuators, broken steering arms, a warped

hull, and ruptured seawater piping which flooded the gas turbine (pers. comm. T. Tucker in Laist *et al.* 2001).

In addition to vessel damage, ship strikes to large whales can also pose a hazard to human safety. In several cases, particularly with small vessels and fast-moving vessels (e.g., ferries), passengers have been knocked off their feet or even thrown from the boat upon impact with a whale. Hazards can be even more severe; Andre *et al.* (1997) in Laist *et al.* (2001) reports a case in the Canary Islands in which a high-speed ferry collided with a sperm whale at 45 knots, killing it and reportedly killing one passenger as well.

Discussion

Many ship strike fatalities almost certainly go undetected, so our database provides a minimum count of such occurrences. In fact, our records may represent only a fraction of the actual number of strikes. Nonetheless, they illustrate the scope and magnitude of the threat of ship strikes to endangered large whale species.

Ship strikes affect at least ten large whale species. Given the low abundance of North Atlantic right whales relative to other species, the frequency of occurrence of ship strikes to right whales suggests that the threat of ship strikes is proportionally greater to this species.

Ship strikes occur in all oceans and off nearly all continents. The small number of collision records from areas outside the United States is undoubtably due to the much reduced likelihood that such strikes were made known to us. The geographic distribution of our records from North America may, in part, be attributed to the disproportionate amount of collision reporting among different regions, as well as a function of high shipping traffic volume in some locations. All vessel classes are represented in our database, but it appears generally that relatively large and relatively fast moving vessels are most often involved.

For a variety of reasons, certain vessel classes are likely over-represented in our data. As noted, federal vessels are more likely to report a strike than commercial vessels due to their standardized reporting practice. In addition, awareness that an animal has been struck may depend upon the number of people on board. Federal ships carry substantial crew, a number of whom are generally on the bridge at any one time (bridge crew on Navy vessels often consists of a half dozen individuals or more). Such crews are more likely to spot a whale and/or register that a collision has occurred than a container ship or tanker with only one or two individuals at the helm. This may also be true for whale watch vessels that have passenger witnesses on board, and thus are more apt to report strikes than those vessels for which a collision may not be witnessed by parties other than captain and crew.

Numbers of ship strike reports in our database that appear high for Navy and Coast Guard vessels may also be factor of size and vessel configuration. A ship must register that a whale has been struck in order to report the incident. Most federal ships are smaller than those used for commerce and thus register impact when large ships may not (i.e., a 10,000 ton Naval ship has a greater likelihood of recognizing that a collision has occurred than does a 40,000 ton container ship). Smaller vessels are also more likely to notice collisions by nature of the location of a forward bridge. The bridges of tankers and container ships are generally located hundreds of feet aft and are high above the water; this can result in a line

of sight well beyond the bow that obscures the direct view in the immediate path of the vessel.

Finally, reporting may also be a factor of geography. Navy operations, for example, are often conducted along continental shelf areas, in the same regions where large whale species are likely to aggregate in pursuit, for example, of prey concentrated there. Thus, the frequency of these reports may be more a factor of geographic overlap than vessel class or mariner behavior. The same is likely true for whale watching vessels which are generally the only vessel class in the vicinity of whales expressly because the whales are there.

Figures reported here for death and injury to whales as a result of ship strike may not accurately reflect the true results of impact. Death as a result of a strike was much more common than injury in our database, but this could be an artifact of most records originating with dead/stranded whales. Likewise, records may not indicate the final condition or status of an injured whale. As an example, if an animal was seen bleeding after impact, dove and was not re-sighted, it was classified as an 'injury' in our database. The whale, in fact, may have died subsequently from the injury, but a lack of information in such cases prevents a final assessment of collision impact. In any case, death or injury, such impacts are capable of delivering significant trauma to the animal.

The factors that contribute to ship strikes of whales are not clear, nor is it understood why some species appear more vulnerable than others. Nonetheless, the number of known ship strikes indicate that deaths and injuries from ships and shipping activities remain a threat to endangered large whale species, right whales in particular. We believe the compilation and presentation of these data will help in defining measures to reduce the incidence of such occurrences.

****

In an effort to use this database as an effective tool in its protection and stewardship of marine mammals, NOAA Fisheries intends to continue adding to the existing information contained in this report as additional ship strike incidents occur. If you have data to contribute relating to a large whale ship collision, please contact:

Large Whale Conservation and Recovery Program *or*
Marine Mammal Health and Stranding Program
Office of Protected Resources
National Marine Fisheries Service
1315 East-West Highway
Silver Spring, MD 20910
301-713-2322

Literature Cited

Best, P.B., J.L. Bannister, R.L. Brownell Jr. and G.P. Donovan (Eds). 2001. Report of the workshop on the comprehensive assessment of right whales: a worldwide comparison. J. Cetacean Res. Manage. (Special Issue) 2:1-60.

Knowlton, A.R. and S.D. Kraus. 2001. Mortality and serious injury of northern right whales (*Eubalaena glacialis*) in the western North Atlantic Ocean. J. Cetacean Res. Manage. (Special Issue) 2:193-208.

Laist, D.W., A.R. Knowlton, J.G. Mead, A.S. Collet and M. Podesta. 2001. Collisions between ships and whales. Marine Mammal Science, 17(1):35-75.

Figure 1. The occurrence of ship strikes in eleven whale species.

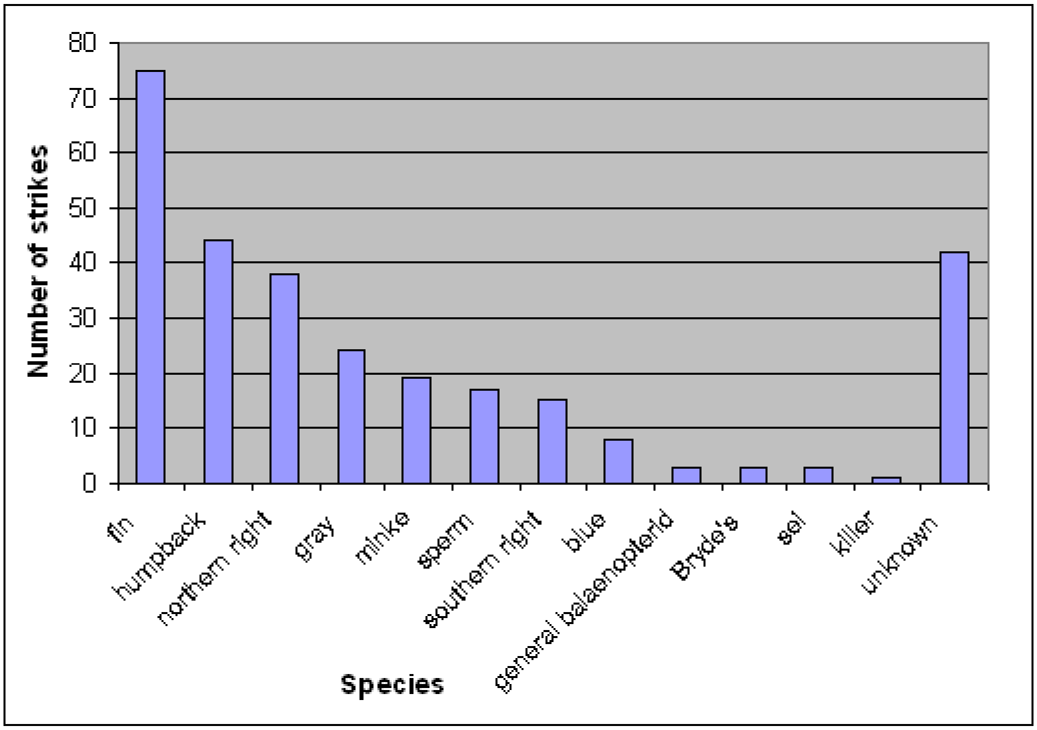


Figure 2. The geographic distribution of ship strikes to large whales world-wide.

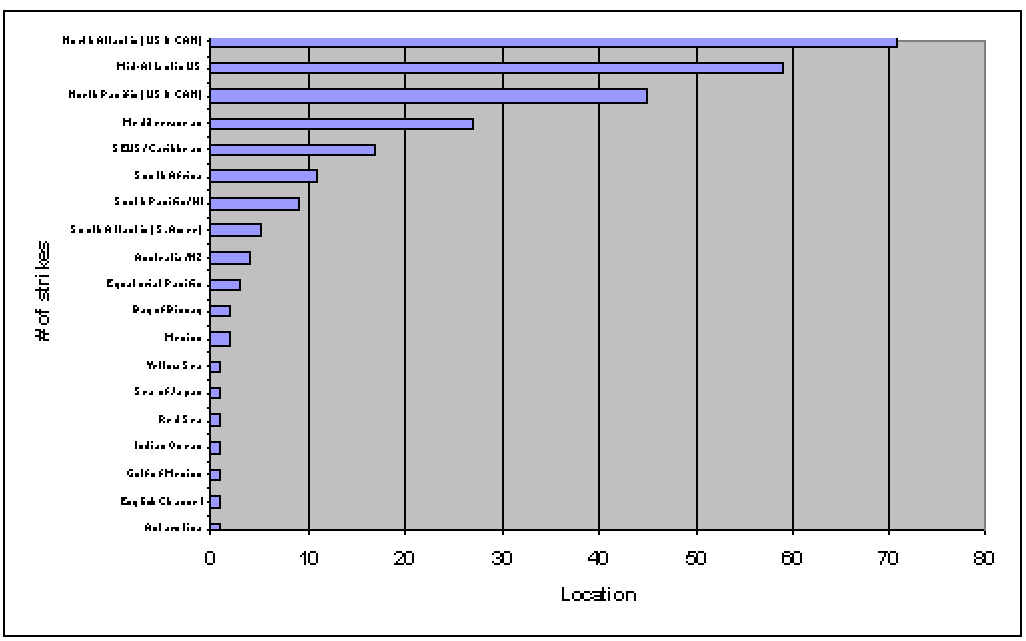


Figure 3. Distribution of vessel strikes to large whales in North America.

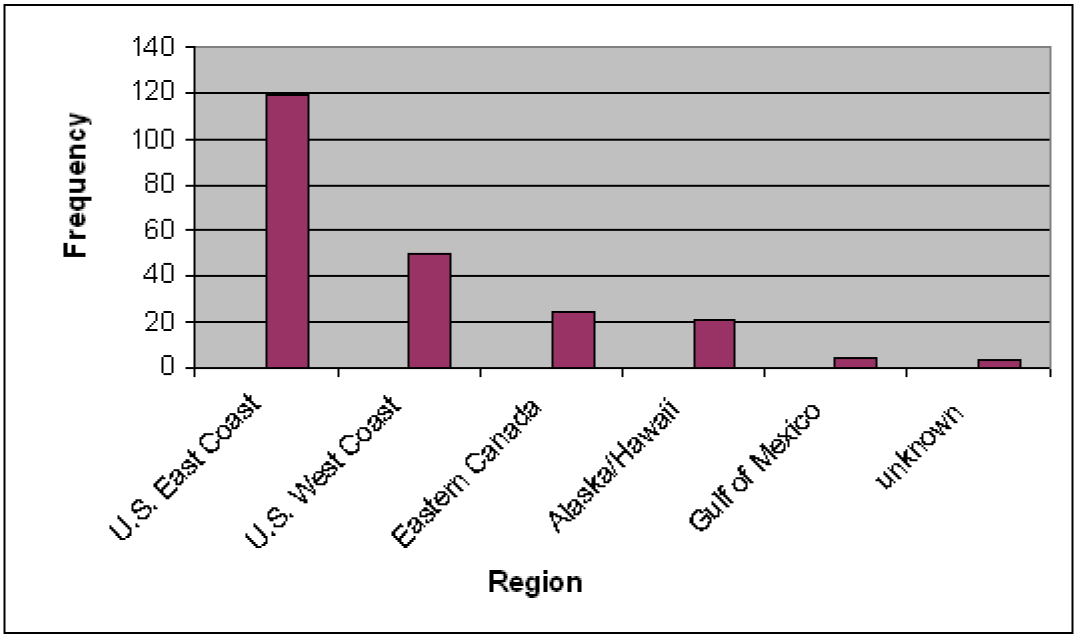


Figure 4. Result of ship strike to large whales.

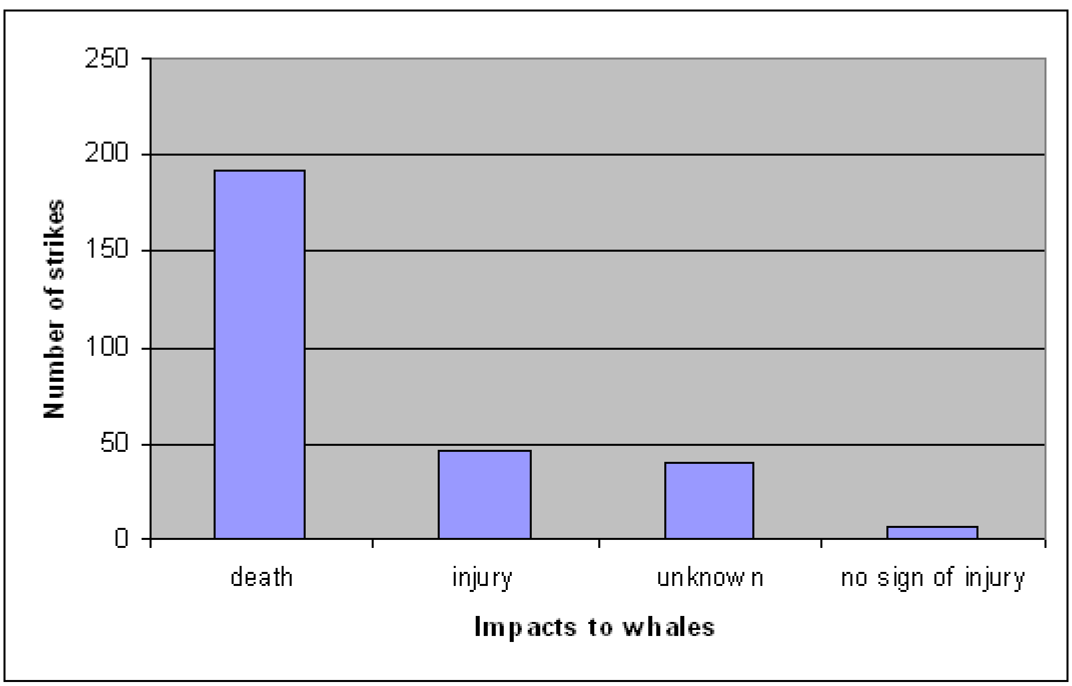
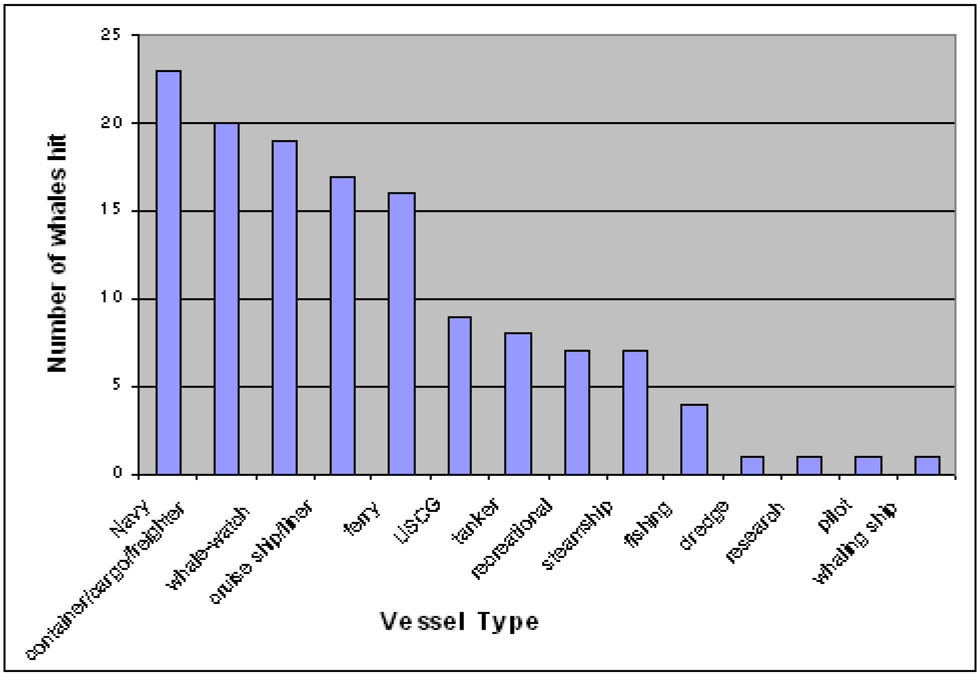
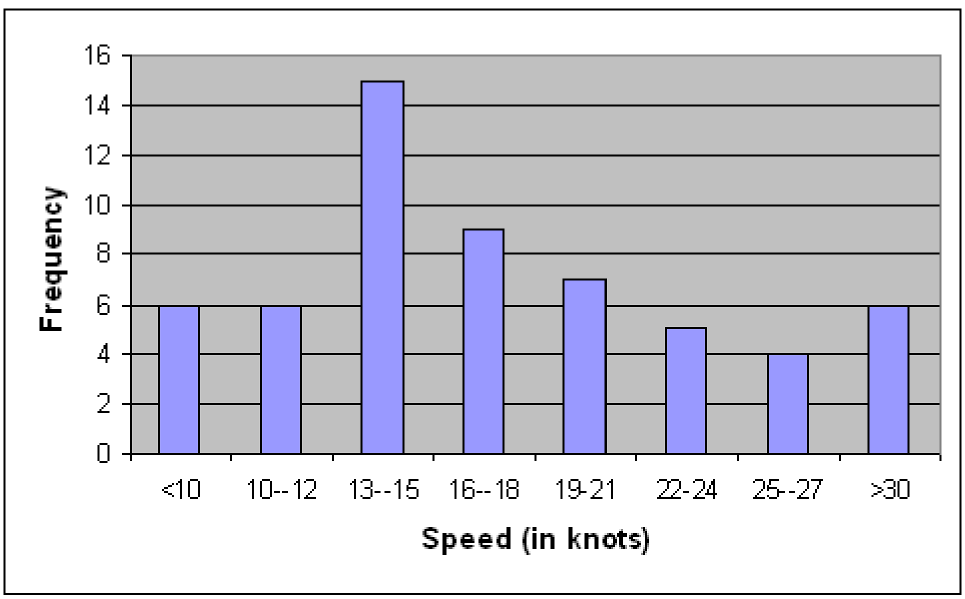


Figure 5. Types of vessel involved in collisions with large whales (where vessel type is reported).



Note: The high occurrence of Navy reports may reflect military and government reporting practice rather than an actual higher frequency of collisions relative to other ship types. Reporting struck or dead whales to NOAA Fisheries is now a part of standard operating practices for Navy and USCG.

Figure 6. The frequency of occurrence of ship speed in ship strike incidents in which ship speed was known.



Source codes and abbreviations for ship strike spreadsheet records:

* = from *Laist et al.* 2001
BO = NOAA Fisheries Biological Opinion
IML = Institute de la Mer et du Littoral, La Rochelle, France
kts = knots
MMC = Marine Mammal Commission
NEFSC = NOAA Fisheries Northeast Fisheries Science Center
nm = nautical miles
NMS = National Marine Sanctuary
NP = National Park
NWFSC = NOAA Fisheries Northwest Fisheries Science Center
NWR = National Wildlife Refuge
OLE = NOAA Fisheries Office of Law Enforcement
SICDD = Smithsonian Institute Cetacean Distributional Database
USCG = U.S. Coast Guard

Vessel names available upon request.

NOAA Fisheries Confirmed and Possible Ship Strikes to Large Whales

Date	Species	Sex	Length (m)	Location (where struck, if known; if not, where found)	Coordinates	Mortality/ Injury	Field ID
US East Coast							
02/08/02	humpback			Cape Henry, VA		mortality	
10/04/01	humpback			Approx. 5 nm NW of Stellwagen Bank, MA		injury	
06/29/01	minke/small sei		7.6	30 nm southeast of Cape Cod, inbound Boston traffic lane, MA	41-30N, 069-27.5W	mortality	
03/17/01	right			Assateague Is, VA		mortality	
02/01/01	finback			Port Elizabeth, NJ Berthing Channel		mortality	
01/02/01	finback			New York Harbor		mortality	
12/11/00	finback	F	10.8	New York Harbor		mortality	
12/04/00	humpback	M	8.5	0.5 nm offshore Cape Lookout, NJ		mortality	
07/29/00	humpback			Stellwagen Bank NMS, MA		unknown	
05/16/00	sperm			Block Canyon, NJ	39-45N, 71-07W	unknown	
05/14/00	humpback			Stellwagen Bank NMS, MA		unknown	
11/06/99	finback			Port Elizabeth, NJ		mortality	
06/23/99	minke		6 est	Near reserve channel, Boston Harbor, MA	42-19.8N, 70-60W	mortality	
04/20/99	right (Staccato)	F	13.7	6 miles N of Griffin Island, Wellfleet, MA	41-54.3N, 70-9.7W	mortality	
02/10/99	finback	M	15.5	False Cape State Park, VA	36-47N, 75.5W	mortality	
12/12/98	minke			Cape Cod Bay, MA		injury	
10/07/98	right			NC/VA state line		mortality	
09/12/98	minke		6	Barnstable, MA		mortality	
08/02/98	humpbacks			Stellwagen Bank NMS, MA		unknown	
06/07/98	2 humpbacks			Boston Harbor, MA		unknown	
05/24/98	minke			6 nm N of Race Pt, MA	42-14N, 70-10W	injury	
03/21/98	finback			Approx. 7.5 nm off Cape Henry, VA	36-5N, 75-48W	mortality	
03/21/98	finback	F	16.9	Salvo, NC	35-28.4N, 75-29W	mortality	

NOAA Fisheries Confirmed and Possible Ship Strikes to Large Whales

Vessel Type	Vessel Size(m)	Speed (kts)	Vessel Damage	Source	Comments
				OLE report	
whale-watch vessel		11.7		NEFSC	animal came up under keel of vessel, abrasion 1.5 ft long by 1 in wide seen anterior to dorsal fin
Navy	253	15	N	ship report	crew heard impact and felt shudder, gray and white whale observed lodged on bow, whale sank after ship backed up
				OLE report	
				OLE report	
				OLE report	
				NEFSC	from necropsy: abrasions, bruising, large hemotoma, 4 broken ribs and broken vertebral processes
				NEFSC	from necropsy: many focal hematomas on left side along ribs, but no pattern and no broken bones
				OLE report	
				OLE report	
				OLE report	
				OLE report	
				NEFSC	badly decomposed whale floating in harbor, carcass towed out to sea by MA Environmental Police
				NEFSC	mortality attributed to ship strike, necropsy points very strongly to traumatic incident that fractured the mandible
				NEFSC	from necropsy: large wound on dorsal peduncle ridge, hemorrhaging, fractured vertebrae indicative of ship strike
whale-watch vessel				NEFSC	body of whale seen in wake of whale watching vessel, blood reported
				OLE report	
whale-watch vessel	24	25	Y	NEFSC	whale swam under bow, impact felt, surfaced w/deep, bleeding gash, dead carcass sighted immediately afterward
whale-watch catamaran	36	18.3		NEFSC	whale surfaced in front of vessel, massive, fresh, bleeding wound across back from flipper to flipper
				OLE report	
				NEFSC	
				NEFSC	
				NEFSC	large hematoma evident from necropsy

NOAA Fisheries Confirmed and Possible Ship Strikes to Large Whales

Date	Species	Sex	Length (m)	Location (where struck, if known; if not, where found)	Coordinates	Mortality/ Injury	Field ID
03/03/98	blue			approaching Narragansett Bay, RI		mortality	
01/03/98	right			Georgia	30-50.7N, 81-9.6W	injury	
08/10/97	unknown			Stellwagen Bank NMS, MA		unknown	
12/10/97	humpback			Beaufort Inlet, NC	34-39N, 76-39W	mortality	
07/20/97	humpback			Cape Cod Bay, MA	42-09.6N, 069-12.9W	unknown	
06/07/97	minke			Sandy Hook Natl. Seashore, NJ	40-28N, 73-59.7W	mortality	
05/12/97	finback		12 est	Boston Harbor, MA	41-23N, 71-02.8W	mortality	
03/21/97	finback		12 est	7.5 nm off VA Beach, VA	36-50N, 75-48.3W	mortality	
11/03/96	humpback	M	8.4	Carrituk, NC	36-18N, 75-48W	mortality	
07/15/96	minke			Off Race Pt., MA		no sign of injury	
07/14/96	finback	M	13.5	Elizabeth Channel, NJ	40-41N, 74-09W	mortality	
05/09/96	humpback	F	7.3	Cape Henelopen State Park, DE	38-36.68N, 75-4.4W	mortality	
04/02/96	humpback	F	7	Cape Story Beach, VA Beach, VA	36-54N, 76-03W	mortality	
03/25/96	right	M		Wellfleet, MA		mortality, stranded	
03/09/96	right	M		MA		mortality	
02/26/96	finback	F	18 est	9 nm off Sandy Hook, NJ	40-18N, 73-46W	mortality	
01/30/96	right		13.7	10 nm east of Sapelo Island, GA		mortality	
11/14/95	finback	F	10	Below Old Cooper River, Charleston, SC	32-48N, 79-56W	mortality	
10/09/95	minke			185 km E of Cape Cod, MA		unknown	
08/13/95	right	F	adult	Gulf of Maine		unknown	
08/01/95	finback		17	48 km SE of Cape Cod, MA		mortality	
06/10/95	minke	F	3.7	Piney Point, MD	38-8N, 76-31.5W	mortality	
06/04/95	humpback	M	8.8	5 nm off Rudee Inlet, VA Beach, VA	36-49N, 75-52W	mortality	
02/01/95	unknown (right?)			Off NC		unknown	

NOAA Fisheries Confirmed and Possible Ship Strikes to Large Whales

Vessel Type	Vessel Size(m)	Speed (kts)	Vessel Damage	Source	Comments
bulbous bow tanker	148			Ford, pers comm	whale found draped across vessel's bow by port pilot, hemorrhaging indicated whale was alive when struck
				NEFSC	entire left fluke lobe extending beyond dorsal notch severed by propeller, wound healed, status good
				OLE report	
				NEFSC	probable ship strike
USCG	82.3	20	N	USCG BO 6/8/98	humpback observed 5-10 ft under surface, thump heard, ship felt shudder, whale struck on starboard, not re-sighted
				NEFSC	from necropsy: severely decomposed, spine broken, likely ship strike
				NEFSC	floater, moderate decomposition, possible ship strike
				NEFSC	ship strike account in initial report
				NEFSC	acute trauma to skull, blunt trauma to left peduncle, likely ship strike
ferry (?)		15		NEFSC	whale hit, re-surfaced, no sign of injury
				NEFSC	ship strike (pre/post undetermined), adjacent to Maersk Shipping
				NEFSC	ship strike (pre/post undetermined)
				NEFSC	from necropsy: stranded, fractured left mandible, possible ship strike
				NEFSC	from necropsy: prop cuts along back, damaged baleen, thick area of skull broken indicating ship strike
				Best et al 2001	broken skull and 3.3 m long gash on back
				NEFSC	floater, possible ship strike
				Navy BO 5/15/97	hemorhagging, massive cranium fracturing, cervical vertebrae broken, indicates blunt trauma w/large vessel
				NEFSC	from necropsy: fractures to skull and hemorrhaging indicative ship strike
USCG	64	15	N	NEFSC	whale sighted off starboard, thud and shudder felt, not re-sighted
				Best et al 2001	cut 60-90 cm deep on right side of head below rostrum and into lower lip, orange cyamids on tail and lip edge
bulbous bow cruise ship	173			SICDD*	vibration felt while ship underway off Cape Cod, whale found on ship's bow in Bermuda with broken spine and extensive bruises
				NEFSC	stranding, large cut through skin on dorsal thorax, likely brought 12 mi up Potomac by ship
				NMFS memo	several major lacerations indicative of collision with a propeller, deepest 27cm., whale likely bled to death
Navy				Laist et al 2001	whale breached in front of submarine, struck bow, slid down vessel's starboard, may have been injured on right side

NOAA Fisheries Confirmed and Possible Ship Strikes to Large Whales

Date	Species	Sex	Length (m)	Location (where struck, if known; if not, where found)	Coordinates	Mortality/ Injury	Field ID
11/17/94	sei		15 est	Charlestown Harbor, Boston, MA		mortality	
08/15/94	minke		2	Hampton Roads, Chesapeake Bay, VA	37N, 76-21.4W	mortality	
08/04/94	right			Gulf of Maine		unknown	
07/19/94	humpback			Stellwagen Bank NMS, MA		unknown	
04/18/94	finback			Penns Grove, NJ		mortality	
04/10/94	humpback			Ocracoke, NC		mortality	
03/12/94	finback	F	16 est	Cape Henry, Chesapeake Bay, VA Beach	36-56N, 76-01.6W	mortality	
02/22/94	right whale calf			FL		mortality (presumed)	
12/31/93	right	F		East of Cape Charles, VA		mortality, floater	
12/06/93	right	M	12--22	NC/VA border, off False Cape		mortality, floater	
12/06/93	right	F		VA		mortality	
10/07/93	humpback			2 km off Atlantic City, NJ		injury	
10/01/93	minke			Sandbridge, VA		mortality	
09/27/93	minke	M	4.3	Ocean City, NJ	38-26N, 75-04.1W	mortality	
Aug-93	finback		15	Boston Harbor, MA	41-23N, 71-03W	mortality	
03/31/93	minke		7.5	New York Harbor, Staten Island, NY	40-39N, 74-03W	mortality	
01/05/93	right whale calf			In transit between Mayport and Ft. Pierce, FL	30-02.44N, 81-16.04W	mortality	
10/09/92	humpback	F	8.7	Metompkin Island, VA	37-46N, 75-32W	mortality	
07/31/92	finback	M	17	Port Newark, NJ	42N, 74.09W	mortality	
06/02/92	finback	F	15.6	Beach Haven Crest, NJ	39-36N, 74-12.5W	mortality	
04/22/92	humpback	F	9	Hatteras National Seashore, NC	35-11.4N, 75-46W	mortality	
04/16/92	humpback	F	9	Asseteague National Seashore, MD	38-10N, 75-10W	mortality	
03/15/92	minke	F	6.8	St. Johns River, FL	30-21.1N, 81-18W	mortality	
03/10/92	humpback	F	10.6	Hatteras Natl. Seashore, NC	35-20N, 75-21W	mortality	

NOAA Fisheries Confirmed and Possible Ship Strikes to Large Whales

Vessel Type	Vessel Size(m)	Speed (kts)	Vessel Damage	Source	Comments
container ship				NEFSC	vessel collision, came in on bow of container ship
				NEFSC	lower jaw broken, had begun to heal, possible ship strike
				OLE report	
				OLE report	
				Laist et al 2001	floating in Delaware River, broken vertebrae, blunt trauma to right pectoral fin and surrounding area
				Laist et al 2001	hemorrhaging in mandible and ventral to left pectoral
				NEFSC	flukes cut off, propeller marks in caudal area
				Best et al 2001	several deep cuts on head and lower lip regions, probable propeller cuts on both sides of dorsal flukes
				NEFSC	
				stranding report	scar on leading edge of fluke near tip and line scar along right side of mid-body, may have been pre-mortem
				Best et al 2001	carcass floating belly up w/large straight gash running from right ventral to right lateral surface anterior to flukes
sport-fishing vessel	10	>10	Y	SICDD*	animal hit while vessel accelerating, 15 min later animal observed "wobbling" while diving, blood seen in water
				Laist et al 2001	left mandible broken
				NEFSC	stranding, possible ship strike, pre/post mortem undetermined
				NEFSC	whale carried into harbor, likely ship strike
Navy				NEFSC	brought in on ship bow, reported to government as ship strike
USCG	25	15	N	Navy BO 5/15/97	calf hit, lacerations observed, carcass found 4 days later w/ 2 series of large propeller cuts from twin engine
				NEFSC	stranding, extensive bruising on right side, internal hemorraging on left flank, ship strike
				NEFSC	from necropsy: moderately decomposed, fractured vertebrae mid-section, death due to ship strike
				NEFSC	stranding, several fractured vertebrae, possible ship strike
				NEFSC	stranding, internal damage extensive, possible ship strike
				NEFSC	stranding, skull disarticulated, blunt trauma left side, possible ship strike
				NEFSC	propeller wounds from large vessel
				NEFSC	stranding, net scars on caudal peduncle, possible propeller wounds on fluke

NOAA Fisheries Confirmed and Possible Ship Strikes to Large Whales

Date	Species	Sex	Length (m)	Location (where struck, if known; if not, where found)	Coordinates	Mortality/ Injury	Field ID
02/14/92	humpback	M	8.6	Floating in mouth of Chesapeake Bay, Virginia Beach, VA	36-59N, 76-08W	mortality	
11/08/91	humpback	M	9	Island Beach State Park, NJ	39-50N, 74-05W	mortality	
08/08/91	unknown			25 nm south of Martha's Vineyard, MA		unknown	
07/06/91	right whale calf		4.6	East of Delaware Bay, DE	38-21.30N, 73-06.30W	mortality	
06/21/91	humpback			Stellwagen Bank NMS, MA		injury	
03/12/91	right	F	2 years	Off FL		mortality	
02/11/91	right	F	calf	Southeast US		injury	
11/25/90	finback	F	13	Curtis Bay, Baltimore, MD	39-40N, 76-40W	mortality	
06/08/90	humpback			Stellwagen Bank NMS, MA		unknown	
02/05/90	humpback		11	S of 18 m marker, Nags Head, NC	35-56.5N, 75-36.5W	mortality	
07/14/89	finback			North Kingstown, RI		mortality	
05/13/88	minke			Duxbury Beach, MA		mortality	
05/13/88	sei			Baltimore, MD		mortality	
05/04/88	finback			Deal, NJ		mortality	
01/15/88	finback			Marshfield, MA		mortality	
08/18/87	finback			Boston, MA		mortality	
02/14/87	right	F	calf	Southeast US		injury	
08/07/86	right	F	1 year	Massachusetts Bay, MA		mortality	
07/02/86	finback			Delaware River, NJ		mortality	
05/06/86	finback			Hoboken, NJ		mortality	
08/27/85	finback			Montauk, NY		mortality	
07/13/85	finback			Stellwagen Bank NMS, MA		unknown	
Aug-84	finback			Stellwagen Bank NMS, MA		injury	
03/07/84	finback			Baltimore, MD		mortality	

NOAA Fisheries Confirmed and Possible Ship Strikes to Large Whales

Vessel Type	Vessel Size(m)	Speed (kts)	Vessel Damage	Source	Comments
				NEFSC	floater, propeller wounds, fractured mandible and eye socket, possible ship strike
				NEFSC	3 propeller cuts observed on head, one cut fractured the right occipital condyle
				OLE report	
USCG	84	22	Y	Navy BO 5/15/97	2 whales 50 yds off bow, calf rolled out from ship w/propeller gashes on body, sank rostrum up, obviously dead
whale-watch vessel	14	5-10		Sullivan and Young*	bow struck and rode up over whale, fresh nick observed between nares and dorsal fin, subsequently re-sighted healthy
				Best et al 2001	from necropsy: shattered skull from ship strike
				Best et al 2001	series of 3 propeller cuts, maximum 1.2 m long x 15 cm deep on left flank
				NEFSC	apparent boat/ship collision, whale likely killed shortly before being found, ship strike mark mid-lateral left side
				OLE report	
				NEFSC	broken mandible, head damage
				SICDD*	stranding record, fractured lower jaw
				SICDD*	stranded, one large gash and three smaller gashes
				SICDD*	brought in on bow of ship, damaged skull
				SICDD*	boat hit, found floating
				SICDD*	identified as possible ship collision
				SICDD*	folded in half forward of dorsal fin on right side, likely brought into port on bow of ship
				Best et al 2001	series of 5 propeller cuts approx 30 cm long and 8 cm deep on left fluke tip
				Best et al 2001	2 propeller cuts, max. 4.5 m long x 1 m deep running longitudinally along body, severed spine
container ship				SICDD*	reported as struck by container ship
cruise ship				SICDD*	brought into port on bow of ship
				SICDD*	floating with propeller slashes, possible ship strike
				OLE report	
whale-watch vessel	28	16		Weinrich*	whale surfaced immediately in front of vessel, after collision whale was not resighted but blood seen in water
				SICDD*	brought into port on bow of ship, bruising evident

NOAA Fisheries Confirmed and Possible Ship Strikes to Large Whales

Date	Species	Sex	Length (m)	Location (where struck, if known; if not, where found)	Coordinates	Mortality/ Injury	Field ID
10/14/83	finback			Fire Island, NY		mortality	
07/31/83	finback			Manhattan, NY		mortality	
02/21/83	right	M	2 years	New Jersey		mortality	
01/24/83	finback			Norfolk, VA		mortality	
01/25/83	finback			Norfolk, VA		mortality	
08/02/82	finback			Elizabeth City, NJ		mortality	
03/31/81	finback			Norfolk, VA		mortality	
08/13/80	right	M		In transit between Mayport and Ft. Pierce, FL		injury	
05/25/80	right	M		Great South Channel, MA		injury	
10/18/79	finback			Baltimore, MD		mortality	
03/05/79	right	M	juv	NY		mortality	
11/05/76	right			ME		mortality	
04/15/76	right	M	calf	MA		mortality	
07/08/75	minke			Boothbay, ME		mortality	
winter 1972	right (possibly)			Approx 97 km E of Boston, MA		mortality	
Aug-52	unknown		15	139 km of Montauk, Long Island, NY		unknown	
1940-45	sperm			North Atlantic		mortality	
1940	baleen whale			Off Cape Hatteras, NC		mortality	
1926	unknown			North Atlantic		mortality	
1912-1915	unknown			Off U.S. East Coast		mortality	
1906	unknown			Off Chatham, MA		injured?	
1896	sperm whale?			Off Sandy Hook, NJ		mortality	
1885	unknown			32 km E of Nantucket, MA		injury	

NOAA Fisheries Confirmed and Possible Ship Strikes to Large Whales

Vessel Type	Vessel Size(m)	Speed (kts)	Vessel Damage	Source	Comments
				SICDD*	slashes on ventral side, possible ship strike
				SICDD*	brought into port on bow of ship
				Best et al 2001	severed tail
				SICDD*	brought into port on bow of ship, bruising evident, reportedly hit off New York
				SICDD*	floating near harbor, bruising evident
				SICDD*	brought in on bow of ship, hit off Boston, MA
				SICDD*	brought into port on bow of ship, later determined to have been hit off Atlantic City, NJ
				Best et al 2001	series of 8 propeller cuts running along left flank and over back, max. 1.2 m length x 15 cm deep
				Best et al 2001	cut along back crossing spine, 1.5 m long x 15 cm deep
Russian cruise ship				SICDD*	brought into port of bow of ship
				Best et al 2001	tail severed
				Best et al 2001	severe lacerations observed on back
				Best et al 2001	large area of bruising observed behind skull, noted as probable ship collision
				Laist et al 2001	stranded, body heavily bruised
bulbous bow container ship	207	21-23		Murphy II*	noticed whale draped across ship's bow in harbor, realized slow speed during night due to impaled animal
Navy	93	14	Y	in Laist et al 2001	whale seen off port, submerged a few seconds before impact, severe damage to vessel
Navy				Slipjer 1962*	
tanker				Burgess 1940*	
ocean liner				Laist et al 2001	
steamship				Laist et al 2001	
steamship				Laist et al 2001	
ocean liner				Laist et al 2001	
pilot boat		13	N	Laist et al 2001	vessel's port bow collided w/whale, whale then seen rolling as if in distress

NOAA Fisheries Confirmed and Possible Ship Strikes to Large Whales

Date	Species	Sex	Length (m)	Location (where struck, if known; if not, where found)	Coordinates	Mortality/ Injury	Field ID
Eastern Canada							
09/27/97	humpback			St. Lawrence Estuary, Canada		injury	
08/19/97	right	F		Bay of Fundy, Canada		mortality	
09/27/00	right	F		Bay of Fundy		injury	
07/23/00	finback				41-52N, 71-22W	unknown	
07/08/00	right	M		Bay of Fundy, Canada		unknown	
10/19/95	right	M		Bay of Fundy, Canada		mortality	
09/26/95	minke			Bergeronnes, St. Lawrence Estuary, Canada		unknown	
09/16/95	right	M	4 years	Bay of Fundy, Canada		injury	
08/14/94	finback			Tadoussac, St Lawrence Estuary, Canada		injury	
07/29/93	finback			Bergeronnes, St. Lawrence Estuary, Canada		injury	
09/05/92	right	F	adult	Bay of Fundy, Canada		mortality	
06/20/92	finback			Tadoussac, St. Lawrence Estuary, Canada		injury	
08/28/87	right			Browns Bank, Canada		injury	
07/09/87	right	M	juv	Nova Scotia		mortality	
08/14/86	right	F		Bay of Fundy, Canada		mortality (presumed)	
08/05/84	right			Browns Bank, Canada		mortality	
10/09/67	unknown		15-18	Gaspe, Quebec, Canada		mortality	
Jul-67	unknown			South of Halifax, Canada		mortality	
1913	unknown			Off Newfoundland, Canada		unknown	
1910	unknown			North Atlantic		mortality	
1908	sperm			Off Newfoundland, Canada		mortality	
1908	unknown			Off Newfoundland, Canada		mortality?	
1904	unknown			Atlantic Ocean		mortality	

NOAA Fisheries Confirmed and Possible Ship Strikes to Large Whales

Vessel Type	Vessel Size(m)	Speed (kts)	Vessel Damage	Source	Comments
whale-watch vessel				Menard*	vessel struck humpback after it surfaced off bow, whale much less active and appeared injured after collision
				Best et al 2001	from necropy: 6 m long haematoma on left side and broken right mandible, no external sign of injury
				NEFSC	seen in July quite healthy, re-sighted in September with deep wound on left side of head
				OLE report	
				NEFSC	seen repeatedly w/ large deep gash on back, wound appears to be from ship strike between 09/99--07/00
				Best et al 2001	4.8 m long gash in back, broken vertebral disks
whale-watch vessel	11	>30		Laist et al 2001	rigid-hulled pneumatic craft collided w/whale, captain could not see directly in front due to high bow
				Best et al 2001	series of propeller cuts, max. 1 m long x 8 cm deep on tail stock and tail, fishing gear through mouth
whale-watch vessel				Laist et al 2001	vessel reported colliding w/whale, hull vibrated, wound seen on animal
whale-watch vessel				Menard*	whale surfaced and struck bow of vessel, wound subsequently observed on animal's back
				Best et al 2001	necropy revealed internal haemorrhaging from impact w/ship, no external sign of injury
whale-watch vessel				Menard*	vessel collided w/whale while whale-watching, wound visible on animal's back in front of dorsal
				Best et al 2001	1 m of right fluke tip missing, severed by propeller
				Best et al 2001	2-3 propeller cuts on left flank, 20-25 cm deep, shallow gash and swelling on right flank
				Best et al 2001	1 m diameter necrotic wound approx 1 m behind blowholes
				Best et al 2001	series of 5 propeller cuts, approx 60 cm long x 10 cm deep on left flank and near spine
passenger ship	232			in Laist et al 2001	whale observed impaled on ship's bow, animal nearly cut in half as vessel backed to dislodge
Navy	219			Cummings*	whale stuck on bow after vessel speed registered too slow, whale sank when vessel backed down to remove it
cargo ship				Laist et al 2001	
steamship				Laist et al 2001	
ocean liner				Laist et al 2001	
ocean liner				Laist et al 2001	
steamship				Laist et al 2001	

NOAA Fisheries Confirmed and Possible Ship Strikes to Large Whales

Date	Species	Sex	Length (m)	Location (where struck, if known; if not, where found)	Coordinates	Mortality/ Injury	Field ID
1903	unknown			Placenta Bay, Newfoundland, Canada		unknown	
US and Canada West Coast							
11/04/02	finback	M	16	Off Waldron Island, WA		mortality	
10/02/02	finback		18.5	Cherry Point, WA		mortality	
08/09/02	finback		17	Elliot Bay, Seattle, WA		mortality	
07/17/02	blue		22-25	8 mi NW of Point Benito, San Fran, CA		mortality	
10/10/01	balaenopterid		15	4.5 mi south of San Nicolas Is., CA		mortality	
08/21/01	balaenopterid	F	15	Los Angeles Harbor		mortality, stranded	
08/20/01	unknown			Channel Islands, 25 nm off San Clemente Is., CA	32-23.5N, 118-50.3W	injury	
08/15/01	unknown			Channel Islands off San Clemente Island, CA	32-34N, 118-25W	injury	
07/28/01	unknown			10 mi off Solana Beach, San Diego, CA		unknown	
01/09/01	gray		3.6	3 mi offshore Montana de Oro State Park, CA	35-20N, 120-56W	injured	
05/28/00	humpback	F	12	Fiddler's Cove, south of Pescadero State Beach, CA		mortality, stranded	C 124
03/19/00	gray	M	12	2 mi W of Orick, Redwood National Park	41-15N, 124-00W	mortality, stranded	VM 2388
12/19/99	gray	M	12	Muir Beach, Golden Gate National Recreation Area		mortality	C 101
05/05/99	unknown			3 nm offshore, Davenport, CA	36-56.8N, 122-05.08W	unknown	
04/30/98	gray	F (juv	12	Stinson Beach, Marin County, CA		mortality, stranded	C 84
04/28/98	gray		6 est	En route to San Diego, CA	32-43N, 117-24W	mortality	
04/24/98	gray		9 est	CA	31-58N, 118-35W	mortality	
01/02/98	gray		12 est	San Pedro, LA county, CA	33-14N, 118-08W	injury	
01/23/99	gray		7.6	Off N Coronado Is, 5 mi from west end, CA		unknown	
01/07/98	gray calf	F	4.5	Crescent City Harbor, CA		injury	C 79
08/31/97	unknown			Dixon Entrance, Canadian waters		unknown	97045
03/25/97	gray		6 (w/o head)	Vandenberg Airforce Base, 1.5 mi N of Purisma Pt., CA		mortality, stranded	VAFB 97-01

NOAA Fisheries Confirmed and Possible Ship Strikes to Large Whales

Vessel Type	Vessel Size(m)	Speed (kts)	Vessel Damage	Source	Comments
steamship				Laist et al 2001	
				San Juan Islander	necropsy indicated blunt trauma through massive hemorrhaging, symmetrical fractures, displaced spine
tanker	46,100 gr tons			NWFSC	ship was en route from Valdez, AK, strike was pre-mortem
container ship	75			NWFSC	whale brought in on bow of ship, gored, strike was pre-mortem
				NOAA Fisheries	four dorsal propeller gashes, animal eviscerated by encounter
freighter				stranding report	animal initially sighted w/2 other whales prior to vessel collision w/freighter
				stranding report	carcass floating on back, 35 ventral grooves visible, large gash in gular region
Navy	57.3			stranding report	diving whale observed off starboard, shudder felt, blood observed in water, whale not resighted
Navy	153.9			stranding report	whale rolled over after collision, disappeared under ship, blood observed in water, whale not resighted
Navy	133	21		stranding report	prior to strike, whale observed 30 yds. off bow, after strike whale surfaced off port bow and swam away, no blood observed
				stranding report	animal sighted thrashing at surface, flukes completely severed, bleeding, final status unknown
				stranding report	skull smashed, suspect ship strike
				stranding report	large gouge on dorsal surface behind blowhole, blood on palate and coming from blowhole
				stranding report	carcass first found floating under Golden Gate Bridge on 12/18/99, rumor of boat strike
USCG				stranding report	ship hit whale and it breached 2-3 times, no blood observed, no animal found on revisitation of site
				stranding report	blood pouring from mouth in surf, then stranded on beach w/massive hemorhage in thoracic cavity
Navy	153.9	22	N	stranding report	whale sighted at 2000 yds, 10 min later ship shuddered, whale observed wrapped around upper bow stem, then sank
Navy	172.8	14		stranding report	whale sighted 1 nm off bow, 1.5 hrs later whale found wrapped around bow, ship backed down, whale sank
USCG	25			stranding report	collision resulted in six 1-ft gashes in animal's side, final status unknown
				stranding report	eyewitness account; animal appeared stunned after collision but no blood observed, animal swam away
				stranding report	calf bleeding profusely on dorsal side, believed to be propeller wound
cruise ship	214			stranding report	called in by passenger, audible sound of boat strike as whale surfaced directly in path of vessel
				stranding report	apparent clean cuts indicating vessel collision, head and left flipper missing

NOAA Fisheries Confirmed and Possible Ship Strikes to Large Whales

Date	Species	Sex	Length (m)	Location (where struck, if known; if not, where found)	Coordinates	Mortality/ Injury	Field ID
02/15/97	unknown			11 mi off Catalina Island, CA		injury	
02/11/97	finback		7.6	LA harbor, CA	33-44.30N, 118-17.00W	mortality	JEH 483
09/17/96	finback		14.5 est	Huntington Beach, CA		mortality	
03/07/95	gray			2.5 mi SE of Point Loma, San Diego, CA		unknown	
03/05/95	humpback		15	Westminster St., Venice, CA		mortality, stranded	JEH 465
01/02/95	gray			Off Anacapa Island, Channel Islands, CA		unknown	
05/14/94	gray		7.6 est	Pismo Beach, San Luis Obispo, CA	35-00N, 120-30W	mortality, stranded	MZH 0005
08/02/93	blue	F	24.4	San Nicolas Island, west end, Ventura County, CA		mortality, stranded	TDL 169
04/06/93	gray			En route from San Diego to Dana Pt, CA		injury	
08/12/91	finback	M	13.5	LA harbor, CA	33-44N, 118-16W	mortality	JEH 434
08/06/91	gray		10.7	8 mi off Oceanside, San Diego County, CA	33-08N, 117-31W	mortality	
04/13/91	gray	F (juv)	9.6 est	Point Richmond, East Bay Regional Park, CA	37-55N, 122-21W	mortality, stranded	JC 1
04/03/91	gray	M	12	Hamilton Air Force Base, Marin County, CA	38N, 122W	mortality, stranded	RLD 382
04/17/91	gray	F	11.4	San Francisco Bay NWR, north of Dunbarton Bridge, CA	37-31N, 122-06W	mortality, stranded	
06/15/90	unknown			Open water S of Clemente Island, Channel Islands, CA	32-39N, 117-47W	unknown	
05/31/90	unknown		12	Open water S of Clemente Island, Channel Islands, CA	32-48.2N, 118-44.7W	mortality	
late 1980's	finback		20	Seattle, WA		mortality	
06/11/89	blue		20	Tacoma, WA		mortality	
03/05/88	gray			Outside Los Angeles Harbor, CA		unknown	
01/11/88	gray	F	8 (juv)	Towed to NMFS dock, Marin County, CA		mortality	RLD 266
08/03/87	blue	F	14	Long Beach Pier J container terminal, CA		mortality	JEH 360
05/02/87	gray	F	11.5	Ft. Baker, Sausalito, Marin County, CA		mortality	RLD 187
02/14/87	gray	M	4.3	SE side of Ventura River, CA		mortality	87-2
01/24/85	unknown			Off southern CA		injury	

NOAA Fisheries Confirmed and Possible Ship Strikes to Large Whales

Vessel Type	Vessel Size(m)	Speed (kts)	Vessel Damage	Source	Comments
rubber inflatable	6	34.8		stranding report	blood in water after collision, injury assumed
freighter or container				stranding report	carcass brought in on bow of unknown freighter or container ship, head and tail missing
freighter				stranding report	animal brought in to harbor on bow of freighter
24-ft runabout, private				stranding report	eyewitness account, animal hit in tail stock area, no apparent injuries
				stranding report	boat collision
whale-watch vessel				stranding report	eyewitness account, whale initially exhibited erratic behavior when hit, then swam away, no blood observed
				stranding report	possible propeller marks
				stranding report	large hematoma on lower right jaw & gular region, 3-5 cuts through ventral pleats indicated propellers, apparent ship strike
Navy	19.8	22	Y	OLE report	whale received 7 x 3-4 in slice along back, circled after collision, bleeding profusely, rolled over, stopped moving
American President Line				stranding report	whale hit by ship north of LA harbor and brought in draped across bow
Navy				stranding report	animal suffered 7 x 3 x 4 in gash on dorsal surface from propeller, bled profusely after collision, then floated belly-up
				stranding report	6-7 fresh cuts on back, appeared to have been made by propeller
				stranding report	5 cuts on right side and dorsal, appear to have been made by propeller
				stranding report	possible vessel collision
Navy				stranding report	vessel collided w/whale, large blood pool observed, survival not probable
Navy	133.5			stranding report	ship struck left side of whale, large portions of whale's remains floated at surface in large pool of blood, then sank
container ship				Ford, pers comm	ship en route from Japan arrived in harbor with whale draped across bow
container ship				Ford, pers comm	whale found draped across bow of ship arriving from southern California
tanker				Laist et al 2001	pod of whales seen directly ahead, dove to avoid ship, last whale to dive was hit, ship did not change course or speed
				stranding report	whale killed by large ship's propeller which severed spinal cord dorsally at skull's occipital
container ship	176			stranding report	hit in Santa Barbara Channel, pushed into harbor
				stranding report	evidence of vessel collision, wound from large ship's propeller
				stranding report	propeller lacerations (4) through dorsal vertabra and base of tail
Navy	126		Y	Tucker in Laist 2001	crew noted back and tail of large whale, large pool of blood astern, increase in aft vibration

NOAA Fisheries Confirmed and Possible Ship Strikes to Large Whales

Date	Species	Sex	Length (m)	Location (where struck, if known; if not, where found)	Coordinates	Mortality/ Injury	Field ID
10/24/80	blue		18	North Pacific		mortality	
01/22/75	gray			Off Pt. Loma, CA		mortality	
12/26/73	orca		calf	Strait of Georgia, B.C., Canada		injury	
11/29/65	sperm			200 km W of San Francisco, CA	37-30N, 123-31W	injury	
Alaska and Hawaii							
04/04/02	humpback			Several nm off Maalaea Harbor, Maui, HI		no sign of injury	
07/16/01	humpback	F		Glacier Bay NP, AK		mortality	
06/19/01	humpback			Dixon Entrance, AK	54-40N, 130-49W		
02/13/01	humpback		5--6	1.5 nm E of Olowalu Pt, Maui, HI	20-46.74N, 156-35.96W	injury	
02/08/01	humpback			2-3 nm S of Club Lanai, HI		injury	
08/16/00	finback			Uyak Bay, AK	57-38.5N, 153-55.9W	no sign of injury	
11/02/99	humpback			Metlakatla, AK		unknown	
07/28/99	humpback		10.6-13.7	Stephens Passage, 60 nm S of Juneau, AK		mortality	
06/04/99	finback		20	Vancouver, Canada		mortality	
03/06/99	humpback		calf	Waters between Maui and Lanai, HI		injury	
02/16/99	humpback		juv	2 mi S of Magregor Point, Maui, HI		injury	
09/24/98	humpback		18	North Pass, outside Juneau, SE AK		unknown	
08/11/98	humpback			North Pass, outside Juneau, SE AK		no sign of injury	
03/30/98	unknown		3.6	Near Pearl Harbor, HI	21-18.01N, 157-57.51W	unknown	EN-98-06-OH
10/12/97	sperm		12-15 est	60 mi SW of Middleton Is, Prince William Sound, AK		no sign of injury	
07/12/97	humpback			NW Shelter Is, outside Juneau, AK		injury	
05/30/97	unknown			Resurrection Bay, Prince William Sound, AK		unknown	
05/20/97	gray	F	10.9	1/4 mi S of Kah Shakes Cove, AK	55-02.00N, 13-00.00W	mortality	
05/16/96	unknown			Blying Sound, Gulf of Alaska, AK	59-23N, 145-09W	injury	

NOAA Fisheries Confirmed and Possible Ship Strikes to Large Whales

Vessel Type	Vessel Size(m)	Speed (kts)	Vessel Damage	Source	Comments
bulbous bow freighter	174			Laist et al 2001	whale drifted free of bow upon arrival in harbor, thought to have been on bow for at least 5 days
Navy	72 tons	51	Y	Laist et al 2001	ship hit whale, vessel came to dead stop w/i 30 m, next day dead whale w/severed tail stranded near collision site
commercial ferry	152	15-18	N	Ford et al 1994*	crunch heard at ship's stern, blood in wake, bull, cow and 2 calves, 1 calf bleeding profusely from visible prop slashes
whale catcher boat	41		Y	Cummings*	vessel approached cow/calf pair, female dove and was hit while surfacing, thrashing whale seen in boat's wake
whale-watch catamaran	19.8		N	OLE report	vessel in neutral, whale surfaced underneath and lifted right stern of vessel several inches
				OLE report	
USCG	33.5	12		stranding report	whale surfaced 10 ft in front of vessel, ship backed down and came to all stop, crew heard thump
whale-watch catamaran	19.7	17	N	OLE report	bump felt on starboard, vessel heeled slightly, young whale surfaced 75 yds away in wake, no blood observed
whale-watch inflatable raft	13.2	15.6	N	OLE report	whale surfaced in front of vessel and was struck by keel, dove and swam away, blood seen in water
USCG	33.5	17		stranding report	whale surfaced and vessel came down on top of it, animal appeared to be uninjured and swam away
Bayliner pleasure craft				stranding report	vessel struck whale while underway, skin left on bow, status unknown
cruise ship	243.8	19	N	stranding report	vibration felt while underway, whale observed wrapped around ship's bow, came loose and sank when ship slowed down
cruise ship	259.7			Ford	ship arrived in harbor en route from Alaska, carcass draped across bow, captain and crew unaware of strike
high speed ferry	16.8			OLE report	vibration from strike felt on vessel, blood in wake as calf surfaced and disappeared, adult whale surfaced and dove
Bertram fishing charter	9.4	12	N	OLE report	boat made contact w/whale, animal surfaced w/blood in water then dove, cut observed on back behind dorsal fin
Bayliner	7.3	12	Y	stranding report	whale surfaced under bow as boat crossed its back, spasmed and dove, knocked vessel and cracked its hull
whale watch catamaran	23.8	2 (rev idle)		stranding report	whale surfaced under catamaran while idling, no evidence of injury
Navy	110.3	8	N	Navy report	whale crossed 20 ft in front of ship's bow back and forth, vessel struck animal on 2nd crossing, animal swam away
fishing vessel		6	N	stranding report	captain reported whale hit on tail, seemed unharmed, went back to feeding
skiff				stranding report	whale hit skiff, turning it over and dumping two people into water
whale-watch vessel	18	20	Y	NMFS memo	large whale surfaced in front of vessel, captain throttled down but whale hit hard, not seen after collision
				stranding report	deep gash on top of head indicative of vessel strike injury
USCG	115	15	N	NMFS memo	whale surfaced 50 yds off vessel, attempt to turn unsuccessful, impact felt, blood in water, no carcass

NOAA Fisheries Confirmed and Possible Ship Strikes to Large Whales

Date	Species	Sex	Length (m)	Location (where struck, if known; if not, where found)	Coordinates	Mortality/ Injury	Field ID
01/16/96	humpback			Off Kihei, Maui, HI		no sign of injury	
06/01/95	unknown			Summer Sound, Southeast AK		injury	
US Gulf Coast							
04/10/99	right			Unknown		unknown	
10/23/98	sperm			Ocean Shore Blvd, Ormond, FL	29-21.1N, 81-4.5W	mortality	
07/22/97	minke					unknown	
12/20/96	finback	M	14	Floating at port dock	32-07.3N, 81-07.9W	mortality	
02/19/94	humpback		8.2	Gulf, Gordon Pass, FL	26-8N, 81-48W	injury	
04/09/90	sperm	F	8.4 est	Grande Isle, LA	29-15N, 89W	mortality	
04/16/91	unknown			Off Key West, FL		unknown	
30-Jan	right		calf	Texas		mortality	
International							
08/07/02	sperm		9	30 nm south of Marquesas	23-56.3N, 82-06.5W	injury	
07/22/02	southern right	M	adult	Argentina		mortality	
06/18/01	sperm			20 mi south of Puerto Rico, Caribbean Sea		mortality	
02/28/01	humpback			Off Enterprise Island, Antarctic Peninsula, Southern Ocean		no sign of injury	
02/01/00	humpback	N/A		Off Antarctic Peninsula, Southern Ocean		injury	
01/11/00	Bryde's	N/A	12.4	SW of Bonaire, Caribbean Sea		mortality	
08/05/98	unknown	N/A		Mediterranean, Nice Harbor, France		unknown	
07/10/98	southern right	F	calf	Die Dam, Quoin Point, S. Africa		mortality	
1997	sperm	F	cow/calf pr	Canary Islands	28-11N, 15-32W	mortality	
08/09/97	sperm			Ischia, Campania, Italy		mortality	
07/31/97	minke			Genova, Liguria, Italy		mortality	
02/24/97	finback	M	5.2	Mediterranean Sea, Marseille		mortality	

NOAA Fisheries Confirmed and Possible Ship Strikes to Large Whales

Vessel Type	Vessel Size(m)	Speed (kts)	Vessel Damage	Source	Comments
whale-watch catamaran	25	9	N	OLE report	vessel came down on top of whale (three in close pod)
fishing vessel	27	9	N	Laist et al 2001	vessel struck whale head-on along port bow, whale observed swimming in circles before contact w/animal lost
				OLE report	
				NEFSC	head detached, possible boat propeller scar
Navy	169.5			Navy memo	
				NEFSC	found on ship's bow
				NEFSC	propeller wounds, seen from 2/19-2/21 swimming normally, likely ship strike
				NEFSC	deep cuts on dorsal surface indicate the ship strike was probably pre-mortem
Navy	24	<40	Y	Tucker*	ship struck whale, extensive damage to vessel, cost $1 million
				Best et al 2001	body severed approx 1 m forward of tail stock
				USCG	whale's pectoral fin cut in half, swimming slowly, fate unknown
				NMFS	
Navy	154	27	N	MMC letter	commanding officer felt shudder on impact, large blood slick in ship's wake, found dead whale upon circling back
inflatable zodiac	5.8	13-15	N	ship report	two whales surfaced immediately in front of zodiac, one hit just below dorsal fin, no sign of blood in water or injury
passenger ship	118	14.3	N	Wikander*	2 whales surfaced 14 m off bow, 1 came up directly under bow and was hit w/loud thud and shudder, blood in water
cruise ship	214	22	N	De Meyer*	harbor master observed whale on ship's bow, time/location of collision determined from decrease in speed during night
high-speed ferry		30	Y	Collet*	vessel hit unidentified whale
				Laist et al 2001	tail cut off
commercial ferry	100	25		Andre*	cow/calf pair resting at surface, loud sound heard, bodies of both animals observed behind vessel amidst blood
				Laist et al 2001	stranded, 3 deep wounds
				Laist et al 2001	stranded w/fractured skull
				Laist et al 2001	stranded, large hematoma on right side of thorax, possible ship strike

NOAA Fisheries Confirmed and Possible Ship Strikes to Large Whales

Date	Species	Sex	Length (m)	Location (where struck, if known; if not, where found)	Coordinates	Mortality/ Injury	Field ID
01/24/97	sperm			Messina, Sicily, Italy		mortality	
07/28/96	southern right		14.6	Scarborough, Cape Peninsula, S. Africa		mortality	
07/26/96	finback	M	14	Mediterranean Sea, between France and Corsica		mortality	
09/26/95	finback	F	18	Mediterranean Sea, Fos sur Mer		mortality	
05/25/95	finback			Livorno, Tuscany, Italy		mortality	
06/17/95	blue			Approaching Hauraki Gulf, New Zealand		mortality	
06/17/95	finback			Shearness Harbour, Kent, United Kingdom		mortality	
11/10/94	southern right		10.7 juv	Shell Bay, St. Helena Bay, S. Africa		mortality	
10/31/94	unknown			22 km W of Niigata, Japan, Sea of Japan		injury	
09/22/94	southern right		11 juv	Kabeljoubank, Breede River, S. Africa		mortality	
07/19/94	finback	M	14.5	Atlantic Ocean, English Channel, Le Havre		mortality	
05/20/94	finback			Cagliari, Sardinia, Italy		mortality	
1994	sei			Approaching Hauraki Gulf, New Zealand		mortality	
10/10/93	southern right	F	calf	Lekkerwater, De Hoop, S. Africa		mortality	
Oct-93	southern right			Rio Grande do Sul, Brazil		mortality	
09/09/93	finback			Mediterranean, St. Tropez, France		mortality	
09/09/93	finback	F		Mediterranean, Toulon Harbor, France		mortality	
08/16/93	southern right		calf	Between Long Beach and Koppie Alleen, S. Africa		mortality	
1992	southern right			Rio Grande do Sul, Brazil		unknown	
05/15/92	bryde's		12	Bass Strait, Australia		mortality	
04/04/92	unknown			19 km W of Callao, Peru		injury	
Feb-92	sperm			Canary Islands	27-56N, 14-34W	mortality	
1991	southern right			Rio Grande do Sul, Brazil		mortality	
05/13/91	finback	M	18.8	Atlantic Ocean, Bay of Biscay, Donges		mortality	

NOAA Fisheries Confirmed and Possible Ship Strikes to Large Whales

Vessel Type	Vessel Size(m)	Speed (kts)	Vessel Damage	Source	Comments
				Laist et al 2001	stranded w/propeller wounds, fractured skull
				Laist et al 2001	broken rostrum and missing skull bones
ferry				Laist et al 2001	brought into port on bow of ship
merchant ship				Laist et al 2001	brought into port on bow of ship
				Laist et al 2001	brought into port on bow of ship, fractured jaw and other wounds
container ship				Ford, pers comm	ship entered Auckland harbor with whale on bow
container ship				Ford, pers comm	whale found wrapped around bow in harbor, pre- or post-mortem strike undetermined
				Laist et al 2001	diagonal slashes across genital aperture
high speed jetfoil ferry	31			Honma et al. 1997*	after collision, tissue and bone indicative of marine mammal removed from waterjet suction pipe at vessel stern
				Laist et al 2001	cuts across back
merchant ship	190			Laist et al 2001	brought into port on bow of ship
				Laist et al 2001	stranded w/propeller wounds on right side, fractured right flipper
container ship				Ford	ship entered Auckland harbor with whale on bow
				Laist et al 2001	tail cut off
				Best et al 2001	whale stranded w/4 propeller cuts on tail stock
				Laist et al 2001	hit by ship, seen floating at sea
bulbous bow ferry	159	20		Collet*	crew felt shock and strong vibrations, decrease in vessel speed, 3 hrs later observed whale caught on bow in harbor
				Laist et al 2001	tail cut off
				Best et al 2001	trawler reported striking a right whale
bulbous bow container ship	121	14		Wapstra*	whale found draped around hull upon entering harbor, necropsy indicated whale alive when hit
research vessel	89	14	N	Ainley*	shudder was felt, blood seen in ship's wake, numerous whales seen in area nearby
high speed ferry	20	45		Andre et al. 1997*	collision resulted in death of one passenger
				Best et al 2001	two halves of right whale found approx 1/2 mile apart
tanker				Laist et al 2001	brought into port on bow of ship, broken jaw

NOAA Fisheries Confirmed and Possible Ship Strikes to Large Whales

Date	Species	Sex	Length (m)	Location (where struck, if known; if not, where found)	Coordinates	Mortality/ Injury	Field ID
04/30/91	finback			Genova, Liguria, Italy		mortality	
28-Apr	finback			Porto Torres, Sardinia, Italy		mortality	
1989	southern right		juv	Rio Grande do Sul, Brazil		mortality	
05/20/89	finback			Olbia, Sardinia, Italy		mortality	
09/07/88	southern right	M	14.1	7 km outside Port Elizabeth Harbor, S. Africa		mortality	
01/16/88	sperm			Cagliari, Sardinia, Italy		mortality	
05/22/87	finback			Olbia, Sardinia, Italy		mortality	
04/27/87	sperm			Savona, Liguria, Italy		mortality	
11/06/86	finback		16	Mediterranean Sea, Fos sur Mer		mortality	
06/28/86	finback			Livorno, Tuscany, Italy		mortality	
06/23/86	finback			Livorno, Tuscany, Italy		mortality	
01/21/85	finback	M	18	Mediterranean Sea, Port La Nouvelle La Franqui		mortality	
10/16/84	southern right		7.2 calf	East London Harbor, S. Africa		mortality	
02/08/84	southern right			Jakkalsfontein, S. Africa		mortality	
07/27/83	southern right		14.3 adult	Beachview, Port Elizabeth, S. Africa		mortality	
09/19/82	finback		13.5	Mediterranean Sea, Villeneuve les Maguelonnes		mortality	
07/05/80	blue			64 km W of Ensenada, Mexico		mortality	
10/19/76	finback	F	12.5	Atlantic Ocean, Bay of Biscay, France		mortality	
04/03/76	finback	M	14.3	Mediterranean Sea, Toulon		mortality	
1974	unknown			Cook Strait, N.Z.		injury	
09/10/74	finback		15	Mediterranean Sea, between Menton and Antibes		mortality	
04/23/74	unknown			<2 km off Baja Peninsula, Mexico		injury	
Oct-73	unknown			Bay of Bengal, Indian Ocean		mortality	
08/30/73	finback		15	Mediterranean Sea, between France and Corsica		mortality	

NOAA Fisheries Confirmed and Possible Ship Strikes to Large Whales

Vessel Type	Vessel Size(m)	Speed (kts)	Vessel Damage	Source	Comments
ferry				Laist et al 2001	brought into port on bow of ferry
				Laist et al 2001	struck by ship 1.5 mi from port, seen alive w/deep wound on back, found dead a day later
				Best et al 2001	stranded w/propeller cuts on head
ferry				Laist et al 2001	struck by ferry near entrance to harbor
twin screw ferry				Laist et al 2001	impact with whale felt, blood in water, three days later whale stranded w/propeller gashes and damaged rostrum
				Laist et al 2001	stranded w/propeller wounds
				Laist et al 2001	brought into port on bow of ship
				Laist et al 2001	stranded w/propeller wounds
tanker				Laist et al 2001	hit by tanker, brought into port on bow of ship
				Laist et al 2001	floating offshore with propeller wounds on back
				Laist et al 2001	floating 5 mi offshore with propeller wounds on back
				Laist et al 2001	stranded, large propeller cuts on back, probable ship strike
Hopper dredge	110			Best et al*	cow/calf pair surfaced in front of dredge, calf took full brunt of impact, struck by propeller as ship passed, stranded, died
				Laist et al 2001	major damage around midlength seen from air
				Laist et al 2001	five apparent propeller gashes
				Laist et al 2001	stranded, cut through middle of back, probable ship strike
tanker	203 m	21		Patten et al. 1980*	whale w/broken spine floated off ship's bow in LA harbor, collision location inferred from decrease in speed
				Laist et al 2001	stranded, large propeller cuts on back, probable ship strike
merchant ship				Laist et al 2001	brought into port on bow of ship, several ribs and cervical vertebra broken
commercial ferry	4,000 tons	17	N	in Laist et al 2001	struck and possibly killed whale, blood noticed in water after vessel passed
				Laist et al 2001	cut through middle, seen floating offshore
private motor yacht	18	10.5	N	in Laist et al 2001	boat shook & veered to port, large whale surfaced at stern w/deep propeller gashes down mid-section, pool of blood seen
Navy	133		N	Cummings*	vessel collided w/large whale at night and sustained no damage
ferry				IML*	brought into port on bow of ship

NOAA Fisheries Confirmed and Possible Ship Strikes to Large Whales

Date	Species	Sex	Length (m)	Location (where struck, if known; if not, where found)	Coordinates	Mortality/ Injury	Field ID
09/03/72	finback	M	12.6	Mediterranean Sea, Nice		mortality	
07/05/72	finback	M	18	Mediterranean Sea, off Calvi		mortality	
Mar-72	unknown			Las Perlas Islands, Panama, Pacific Ocean		injury	
1963	unknown			Equatorial Pacific		injury	
Sep-61	unknown			Caribbean Sea		injury	
02/01/60	unknown			W of Cape Reinga, North Island, New Zealand		injury	
03/22/55	sperm		10	89 km W of Cape Gardafui, Canary Islands		mortality	
12/25/54	unknown			11 km off Kaikoura, South Island, New Zealand		unknown	
fall 1953	unknown			N Yellow Sea		mortality	
1950	Bryde's			Red Sea, Egypt		mortality	
1930's	unknown			Near Raratonga, South Pacific		mortality	

NOAA Fisheries Confirmed and Possible Ship Strikes to Large Whales

Vessel Type	Vessel Size(m)	Speed (kts)	Vessel Damage	Source	Comments
ferry				IML*	brought into port on bow of ship
ferry				Laist et al 2001	hit by ferry, seen floating at sea
Boston whaler	4	>25		Cummings*	boat struck whale and rode directly over the animal, after collision animal seen thrashing w/bloody wound
passenger ship	14,000 tons	18	N	Cummings*	whale in front of vessel was struck, small amount of blood in water, whale appeared to swim away slowly
cargo vessel	8,000 tons	14		Laist et al 2001	whale first sighted lying at surface, then seen thrashing in wake w/blood in water after collision
passenger ship	13,000 tons			Cummings*	vessel shuddered and slowed when propeller struck whale, animal then seen thrashing w/back sliced and bleeding
steamship	144	17		Slipjer 1979*	whale struck on head and body and became lodged on bow below water line
passenger ship	133	18	Y	Cummings*	vessel collided w/large whale and sustained damage
Navy	169	~20	N	Cummings*	shudder was felt, object on bow identified as whale, ship backed down to dislodge whale which then sank
tanker				Laist et al 2001	
steamer	131	15		Cummings*	ship collided w/large whale and almost cut it in half

Exhibit B

Revised 10/30/2007

BLUE WHALE (*Balaenoptera musculus*): Eastern North Pacific Stock

STOCK DEFINITION AND GEOGRAPHIC RANGE

The International Whaling Commission (IWC) has formally considered only one management stock for blue whales in the North Pacific (Donovan 1991), but this ocean is thought to include more than one population (Ohsumi and Wada 1972; Braham 1991), possibly as many as five (Reeves et al. 1998). Blue whales in the North Pacific produce two distinct, stereotypic calls that have been termed the northwestern and northeastern call types, and it has been proposed that these represent two distinct populations with some degree of geographic overlap (Stafford et al. 2001). The northeastern call predominates in the Gulf of Alaska, the U.S. West Coast, and the eastern tropical Pacific, and the northwestern call predominates from south of the Aleutian Islands to the Kamchatka Peninsula in Russia (Stafford et al. 2001). Both call types are represented in lower latitudes in the central North Pacific but differ in their seasonal patterns (Stafford et al. 2001). Gilpatrick and Perryman (submitted) showed that blue whales from California to Central America are on average about two meters shorter than blue whales from the central and western north Pacific regions. Mate et al. (1999) used satellite tags to show that the eastern tropical Pacific is a migratory destination for blue whales that were tagged off southern California, and photographs of blue whales on the Costa Rica Dome in the eastern tropical Pacific have matched individuals that had been previously photographed off California (Calambokidis, pers. comm.). Photographs of blue whales in California have also been matched to individuals photographed off the Queen Charlotte Islands in northern British Columbia (Calambokidis, pers. comm.) and to one individual photographed in the northern Gulf of Alaska (Calambokidis and Barlow, pers. comm.).

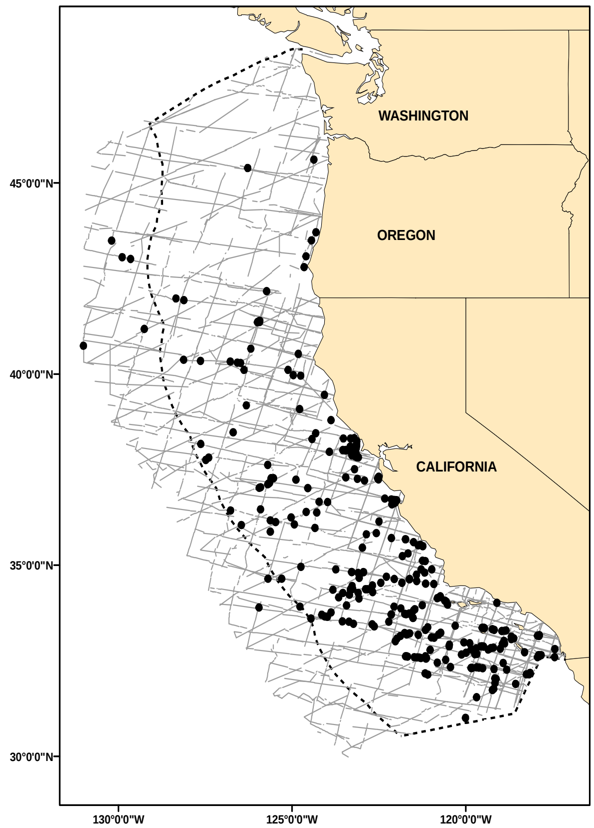


Figure 1. Blue whale sighting locations based on aerial and summer/autumn shipboard surveys off California, Oregon, and Washington, 1991-2005 (see Appendix 2 for data sources and information on timing and location of surveys). Dashed line represents the U.S. EEZ; thin lines represent completed transect effort for all surveys combined.

For the Marine Mammal Protection Act (MMPA) stock assessment reports, the Eastern North Pacific Stock of blue whales includes animals found in the eastern North Pacific from the northern Gulf of Alaska to the eastern tropical Pacific. This definition is consistent with both the distribution of the northeastern call type and with the known range of photographically identified individuals. Based on locations where the northeastern call type has been recorded, some individuals in this stock may range as far west as Wake Island and as far south as the Equator (Stafford et al. 1999, 2001). The U.S. West Coast is certainly one of the most important feeding areas in summer and fall (Figure 1), but, increasingly, blue whales from this stock have been found feeding to the north and south of this area during summer and fall. Most of this stock is believed to migrate south to spend the winter and spring in high productivity areas off Baja California, in the Gulf of California, and on the Costa Rica Dome. Given that these migratory destinations are areas of high productivity and given the observations of feeding in these areas, blue whales can be assumed to feed year round. Some individuals from this stock may be present year-round on the Costa Rica Dome (Reilly and Thayer 1990).

However, it is also possible that some Southern Hemisphere blue whales might occur north of the equator during the austral winter. One other stock of North Pacific blue whales (in Hawaiian waters) is recognized in the Marine Mammal Protection Act (MMPA) Stock Assessment Reports.

POPULATION SIZE

The size of the feeding stock of blue whales off the U.S. West Coast was estimated recently by both line-transect and mark-recapture methods. Barlow (2003) estimated 888 (CV=0.40) blue whales off California, Oregon, and Washington based on ship line-transect surveys in 2001 and Forney (2007), estimated 721 (CV=0.27) from a 2005 line-transect survey of the same area. The unweighted geometric mean of the 2001 and 2005 line transect estimates is 800 (CV=0.24) whales. Calambokidis et al. (2003) used photographic mark-recapture and estimated population sizes of 1,567 (CV=0.32) based on 2000-2002 photographs of left sides and 1,953 (CV=0.33) based on right sides. The average of the mark-recapture estimates is 1,760 (CV=0.32) whales. . Mark-recapture estimates are often negatively biased by individual heterogeneity in sighting probabilities (Hammond 1986); however, Calambokidis et al. 2003 minimize such effects by selecting one sample that was taken randomly with respect to distance from the coast. Similarly, the line-transect estimates may also be negatively biased because some blue whales in this stock are outside of the study area at the time of survey (Calambokidis and Barlow 2004). The best estimate of blue whale abundance is the unweighted geometric mean of the line-transect and mark-recapture estimates, or 1,186 (CV=0.19).

Minimum Population Estimate

The minimum population estimate for blue whales is taken as the lower 20th percentile of the log-normal distribution of abundance estimated from the combined mark-recapture and line-transect estimates, or approximately 1,005.

Current Population Trend

There is some indication that blue whales increased in abundance in California coastal waters between 1979/80 and 1991 (regression p<0.05, Barlow 1994) and between 1991 and 1996 (not significant, Barlow 1997). Although this may be due to an increase in the stock as a whole, it could also be the result of an increased use of California as a feeding area. The size of the apparent increase in abundance seen by Barlow (1994) is too large to be accounted for by population growth alone. Also, Larkman and Veit (1998) did not detect any increase along consistently surveyed tracklines in the Southern California Bight from 1987 to 1995. Although the population in the North Pacific is expected to have grown since being given IWC protected status in 1966, there is no evidence showing that the eastern North Pacific stock is currently growing. Estimates from line transect surveys declined between 1991-2005 (Figure 2), which is probably due to interannual variability in the fraction of the population that utilizes California waters during the summer and autumn.

CURRENT AND MAXIMUM NET PRODUCTIVITY RATES

No information exists on the rate of growth of blue whale populations in the Pacific (Best 1993).

POTENTIAL BIOLOGICAL REMOVAL

The potential biological removal (PBR) level for this stock is calculated as the minimum population size (1,005) times one half the default maximum net growth rate for cetaceans (½ of 4%) times a recovery factor of 0.1 (for an endangered species which has a minimum abundance less than 1,500), resulting in a PBR of 2.0. Because this stock spends approximately half its time outside the U.S. EEZ, the PBR allocation for U.S. waters is half this total, or 1.0 whales per year.

HUMAN-CAUSED MORTALITY AND SERIOUS INJURY

Historic Whaling

The reported take of North Pacific blue whales by commercial whalers totaled 9,500 between 1910 and 1965 (Ohsumi and Wada 1972). Approximately 2,000 were taken off the west coast of North America between 1919 and 1929 (Tonnessen and Johnsen 1982). Partially overlapping with this is Rice's (1992) report of at least 1,378 taken by factory ships off California and Baja California between 1913 and 1937. Shore-based whaling stations in central California took 3 blue whales between 1919 and 1926 (Clapham et al. 1997) and 48 blue whales between 1958 and 1965 (Rice 1974). Additional blue whales were killed during this period from land-stations in British Columbia. Blue whales in the North Pacific were given protected status by the IWC in 1966, but

Doroshenko (2000) reported that a small number of blue whales were taken illegally by Soviet whalers after that date.

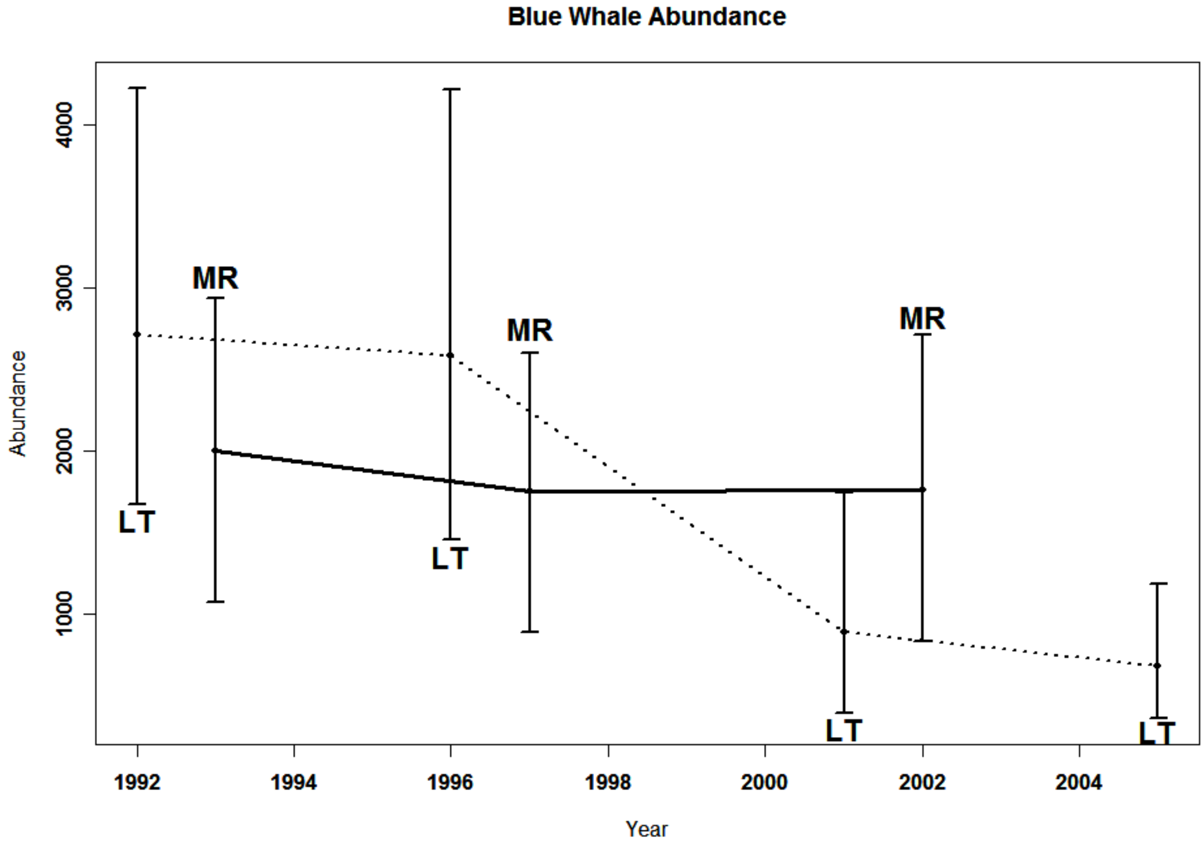


Figure 2. Estimates of abundance from vessel-based line transect (LT) and mark-recapture (MR) surveys conducted in California waters, 1991-2005 (Barlow 2003; Calambokidis et al. 2003; Calambokidis and Barlow 2004; Forney 2007). The four line transect estimates are based on one 1991-93 pooled estimate and three annual surveys conducted in 1996, 2001, and 2005, respectively. The three mark-recapture estimates are based on 1991-93, 1995-97, and 2000-02 pooled estimates, respectively.

Fisheries Information

The offshore drift gillnet fishery is the only fishery that is likely to take blue whales from this stock, but no fishery mortalities or serious injuries have been observed (Table 1). Detailed information on this fishery is provided in Appendix 1. After the 1997 implementation of a Take Reduction Plan, which included skipper education workshops and required the use of pingers and minimum 6-fathom extenders, overall cetacean entanglement rates in the drift gillnet fishery dropped considerably (Barlow and Cameron 1999). Mean annual takes for this fishery (Table 1) are based only on 2000-2004 data. This results in an average estimate of zero blue whales taken annually. Some gillnet mortality of large whales may go unobserved because whales swim away with a portion of the net; however, fishermen report that large rorquals (blue and fin whales) usually swim through nets without entangling and with very little damage to the nets.

Drift gillnet fisheries for swordfish and sharks exist along the entire Pacific coast of Baja California, Mexico and may take animals from the same population. Quantitative data are available only for the Mexican swordfish drift gillnet fishery, which uses vessels, gear, and operational procedures similar to those in the U.S. drift gillnet fishery, although nets may be up to 4.5 km long (Holts and Sosa-Nishizaki 1998). The fleet increased from two vessels in 1986 to 31 vessels in 1993 (Holts and Sosa-Nishizaki 1998). The total number of sets in this fishery in 1992 can be estimated from data provided by these authors to be approximately 2700, with an observed rate of

marine mammal bycatch of 0.13 animals per set (10 marine mammals in 77 observed sets; Sosa-Nishizaki et al. 1993). This overall mortality rate is similar to that observed in California driftnet fisheries during 1990-95 (0.14 marine mammals per set; Julian and Beeson, 1998), but species-specific information is not available for the Mexican fisheries. Previous efforts to convert the Mexican swordfish driftnet fishery to a longline fishery have resulted in a mixed-fishery, with 20 vessels alternately using longlines or driftnets, 23 using driftnets only, 22 using longlines only, and seven with unknown gear type (Berdegué 2002).

Table 1. Summary of available information on the incidental mortality and injury of blue whales (Eastern North Pacific stock) for commercial fisheries that might take this species (Carretta and Chivers 2004, Carretta et al. 2005a, 2005b). Mean annual takes are based on 2000-2004 data unless noted otherwise.

Fishery Name	Year(s)	Data Type	Percent Observer Coverage	Observed Mortality (and injury)	Estimated mortality (CV in parentheses)	Mean Annual Takes (CV in parentheses)
CA/OR thresher shark/swordfish drift gillnet fishery	2000	Observer data	22.9%	0	0	0
	2001		20.4%	0	0	
	2002		20.0%	0	0	
	2003		20.2%	0	0	
	2004		20.6%	0	0	
Total Annual Takes						0

Ship Strikes

Ship strikes were implicated in the deaths of blue whales in 1980, 1986, 1987, 1993, 2002 and 2004 (J. Cordaro, Southwest Region, NMFS and J. Heyning, pers. comm.). In addition, there was one blue whale injured as the result of a ship strike in 2003 (blood observed in the water). During 2000-2004, there were an additional five injuries and three mortalities of unidentified large whales attributed to ship strikes. Additional mortality from ship strikes probably goes unreported because the whales do not strand or, if they do, they do not always have obvious signs of trauma. Several blue whales have been photographed in California with large gashes in their dorsal surface that appear to be from ship strikes (J. Calambokidis, pers. comm.). The average number of blue whale mortalities and injuries in California attributed to ship strikes was 0.6 per year for 2000-2004.

STATUS OF STOCK

As a result of commercial whaling, blue whales were formally listed as "endangered" under the Endangered Species Act (ESA) in 1973. They are still listed as “endangered”, and consequently the Eastern North Pacific stock is automatically considered as a "depleted" and "strategic" stock under the MMPA. The annual incidental mortality and injury rate (0.6/year) from ship strikes is less than the calculated PBR (1.0) for this stock, but this rate does not include unidentified large whales struck by vessels, some of which may have been blue whales. To date, no blue whale mortality has been associated with California gillnet fisheries; therefore, total fishery mortality is approaching zero mortality and serious injury rate.

Habitat Concerns

Increasing levels of anthropogenic sound in the world’s oceans (Andrew et al. 2002) have been suggested to be a habitat concern for blue whales (Reeves et al. 1998).

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Exhibit C

Large Whale Ship Strikes Relative to Vessel Speed

Note: This white paper was developed within NOAA Fisheries as supporting documentation to provide explanation into the development of the operational measures in the proposed ship strike strategy. The paper should be considered a working document to be used as a tool for policy analysis and to further understand the origin of proposed measures. Comments on the document are welcomed, and may be sent to aleria.jensen@noaa.gov.

1. Introduction

The western North Atlantic right whale *(Eubalaena glacialis),* currently numbering about 300-350 individuals, remains critically endangered as a result of intensive historical commercial whaling. A number of anthropogenic factors continue to limit the recovery of this population, namely mortalities from ship strikes and entanglements in fishing gear. Ship strikes to large whales were thought to be a relatively rare occurrence, given that they are often overshadowed by the more apparent, more often reported, (and often prolonged) entanglement in fishing gear. However, it is clear from recent records that ship strikes are relatively common, and an average of about 1-2 right whales ship strike deaths occur annually (Jensen and Silber, 2003). Likely more occur but go undetected.

Ship collisions are responsible for more right whale deaths than any other single human impact. Between 1991-2002, 14 right whale deaths have been attributed to ship strike (Waring *et al.*, 2001). Of 45 right whale deaths recorded between 1970 and 1999, sixteen (35.5%) resulted from injuries caused by collision with a ship. Thirteen (28.9%) were neonatal deaths attributed to perinatal complications or other natural causes, two (4.4%) were deaths related to entanglement in fishing gear, and fourteen (31.1%) died of unknown causes (Knowlton and Kraus, 1998). Thus, ship strikes are responsible for 16 of 18 right whale deaths attributed to human activity during this time period. It is important to note, however, that many ship strikes go unreported, and therefore it is highly likely that right whale mortality from ship collisions is far higher than the figure presented here.

In order to better protect this species, it is crucial to address and mitigate those human activities that result in mortality. The Final Recovery Plan for the Northern Right Whale (NMFS, 1991) lists the reduction of human-caused mortality as the number one priority for the recovery of the species, and the revised draft places similarly high priority on reducing ship strikes (in press).

Ship strikes probably occur because right whales are slow swimmers, spend considerable time at the surface, and perhaps most importantly have a coastal distribution that overlaps with heavy shipping traffic. Right whales are either unable or unlikely to detect oncoming ships or may be engaged in vital activities (e.g., feeding, mating/social activities) and are either oblivious to, or do not respond to approaching ships.

Means to reduce ship strikes in right whales have been under discussion for a number of years. It

is a complex issue and the factors resulting in the high number of strikes are not well understood. In addition, management options (i.e., changes in routing) may be limited due to such things as navigational hazards, maritime safety issues, and oceanographic conditions. The most feasible and likely most effective strategies may involve educating mariners and making them aware of right whale issues, routing changes, and reductions in ship speed.

Overall, the most desirable approach is to minimize the co-occurrence of whales and passing ships. While some steps can be taken to accomplish this, it is not possible in many locations and instances. It is not a feasible alternative to move the whales from preferred habitat; and due to vital commerce, it is not practical to eliminate ship traffic from certain commercial shipping lanes and crucial ports.

As NOAA Fisheries considers measures to reduce the threat of ship strikes to right whales, it is critical to examine the role of vessel speed in whale-ship collisions in order to determine whether a speed restriction measure may have the potential to reduce the frequency and severity of ship strikes to right whales. We attempt to summarize what is known about the impacts of vessel speed on whales, and, more specifically, to address the issue of speed in the cases of ship collisions with large whales. We do this through a review of literature on known ship strikes, a database on known ship strikes and known speeds, hydrodynamic research, and selected case studies of the effect of slowing vessels and vehicles. We also attempt to summarize industry perspectives and views about the use of speed regulations based on numerous non-scientific interviews conducted as part of an initial set of management recommendations submitted to the agency. Additionally, NOAA Fisheries viewed speed as a measure of "last resort"; that is, it is considered only when other potential options are insufficient to reduce the risk.

There are few definitive data on whether slowing ships reduces the likelihood of ship strikes. But there are also few clear indications about ways to reduce ship strikes in general. There are, however, a number of indications and indirect evidence that suggest reduced ship speeds will enhance the likelihood of ships avoiding whales. This paper is an analysis of the available information on ship speed relative to collisions with large whale species.

2. Materials and Methods: Existing Data

There have been several attempts to compile all known records of ship strikes of large whales (Laist et al., 2001) and known ship strike records of right whales (Knowlton and Kraus, 2001). NOAA Fisheries also compiled a database of all known records for all large whale ship strikes world-wide from Laist et al. (2001) and Best et al. (2001), marine mammal stranding reports, ship reports, NOAA Office of Law Enforcement reports, personal communications and a review of the literature on this issue (Jensen and Silber, 2003). These sources in total reveal 292 records of known or probable ship strikes to large whales. To the best of our knowledge, reports from these sources represent the majority of known cases of ship collisions with large whales from 1975-2002. Since publication, NOAA Fisheries has received several dozen additional reports consisting of historical incidents not originally included in the database, as well as strikes to

whales subsequent to 2002 (Jensen, pers. comm.).

Records of ship strikes come from several sources. Direct reports from ships, crew and captains are the most reliable source of information on an actual ship strike incident. In these cases, in which the ship's crew was aware of the strike, it is possible to obtain information on ship speed, damage to a ship, and relative degree of severity of the strike to the animal.

Ship strike information can also be determined from stranded or floating dead whales in which definitive evidence of a massive internal or external trauma or lacerations from propellers are documented. In these cases, however, there is virtually no information on how, when, or where the strike occurred. In addition, in some cases of stranded or floating dead whales, it is difficult (when decomposition is advanced or forensics do not have sufficient resolution) to determine whether the injury indicative of ship strike occurred pre- or post-mortem.

Another type of record is the occurrence of a ship entering port with a whale carcass draped across its bow. Generally, in these instances the ship's crew was unaware of the strike.
Most often this occurs with large container, tanker and cruise ships, and a collision is only determined when the whale is noticed wrapped around the bow by a pilot boarding the vessel or lookouts posted for harbor entry. In 42 of 292 known or probable cases of ship strike, evidence of a collision was only noticed when a whale was brought into harbor on the bow of a large vessel. Time and location of impact were determined by back-calculating to correlate with a previously unexplained decrease in vessel speed (Jensen and Silber, 2003).

Given the fact that large vessel operators often do not detect the impact of striking a whale, animals may be hit and passed over without observation. Likewise, operators may be aware of a strike, but choose not to report it. Again, it is highly likely that far more collisions are occurring than are actually reported.

Shipping Industry Input

Any attempt to require ships to reduce speeds in certain areas may be met with skepticism or opposition by the shipping industry. For most segments of the industry, delays in travel time translate into economic loss. Like many industries, the delivery of goods is time sensitive and critical. And, like most industries, there is much competition.

Shipping industry representatives have participated in various fora in which the impact of ship strikes and protective measures for whales have been discussed. Segments of the industry, at minimum, understand the endangered status of North Atlantic right whales and the problem of ship strikes. All commercial ships 300 gross tons or greater entering the Mandatory Ship Reporting system are required to report their locations and, in return, receive reports as to recent right whale sighting locations. In addition, NOAA Fisheries has engaged in an aggressive outreach program to distribute right whale materials and placards to port authorities, pilots, and maritime training facilities. Further, right whale information is included in Coast Pilot publications and nautical charts. Industry representatives also participate in the Northeast and

Southeast Right Whale Recovery Implementation Teams. Most industry representatives engaged in this dialog acknowledge that some measures may be necessary to address the adverse effects of shipping operations on endangered whale species. The views toward speed restrictions are mixed, but many industry personnel understand the limited tools and technology presently available to effect right whale avoidance.

3. Results

Speed Data

Vessel speed at the time of strike was reported for 58 (19.8%) of the 292 cases in the 2003 NOAA Fisheries database. Operating speeds of vessels that struck various species of large whales ranged from 2–51 knots with an average speed of 18.1 knots. The average vessel speed that resulted in injury or mortality to the whale was 18.6 knots. Evidence of serious injury or mortality is characterized by blood noted in water; animal observed with cuts; propeller gashes or severed tailstock; animal observed sinking after strike indicating death; fractured skull, jaw, vertebrae; hemorrhaging, massive bruising or other injuries noted during necropsy of animal. Of the 58 cases, 19 (32.8%) resulted in injury to the whale and 20 (34.5%) resulted in mortality. Thus, a total of 39 (67.2%) ship strikes are known to have resulted in injury or mortality to the animal. When these 58 reports are grouped by speed, most vessels were traveling in the ranges of 13–15 knots, followed by speed ranges of 16–18 knots and 22-24 knots. These speed groupings may be consistent with normal operational speeds for different commercial vessel types.

There are only two definitive strikes to right whales in particular where associated vessel speed is known with absolute certainty. One incident occurred on July 6, 1991 when a right whale calf was killed east of the Delaware Bay by a ship traveling at 22 knots. A second right whale, a juvenile, was killed on January 5, 1993 between Mayport and Fort Pierce, Florida by an 82 ft. vessel operating at 15 knots. A third collision that may have involved a right whale occurred in the winter of 1972/73 east of Boston, Massachusetts. A bulbous bow container ship traveling at 21-23 knots collided with an unidentified whale, killing it. The animal is listed in the record as a possible right whale (Laist et al., 2001).

Distribution of Strikes

Ship strikes to large whales occur world-wide. From the 2003 database of compiled ship strikes, collision incidents in the U.S. are recorded from almost every coastal state: Alaska, California, Delaware, Florida, Georgia, Hawaii, Maine, Maryland, Massachusetts, New Jersey, New York, North Carolina, Oregon, Rhode Island, South Carolina, Texas, Virginia, and Washington. Also, collisions occurred in three National Marine Sanctuaries (NMS): Stellwagen Bank NMS (humpback, fin and right whales), Channel Islands NMS (gray and several unidentified whales) and the Hawaiian Islands Humpback Whale NMS (humpback whales). Internationally, large whale ship strikes are recorded from waters off Canada, Puerto Rico, Brazil, Peru, Panama, South Africa, Japan, Antarctica, Mexico, France, Australia, New Zealand, the Canary Islands, the Caribbean Sea, the South Pacific, the Indian Ocean and the Yellow Sea.

Of 53 ship strikes to right whales world-wide, 28 (53%) occurred in the waters off the United States. Ten right whale ship collisions occurred in the northeast (including the Gulf of Maine and the Great South Channel), eight in the mid-Atlantic (from New York to North Carolina) and eight in the southeast (including waters off Florida, Georgia and Texas). Two right whale ship strikes were reported along the U.S. Gulf Coast. Ten right whale ship strike victims were reported in Canada (in the Bay of Fundy, Browns Bank and off Halifax, Nova Scotia), ten in South Africa, four in Brazil, and one in Argentina. Thus, it is clear that most recorded right whale strikes have occurred in Canada, the northeast U.S. and South Africa.

Strikes by Species

From our database, eleven different species were confirmed victims of ship strikes: humpback, finback, North Atlantic right, southern right, sperm, blue, gray, sei, minke, killer and Bryde's whales. Of the ship strike records available, finback whales are the most often reported species hit (75 records of strike), followed by humpback (44 records), North Atlantic right (38 records), gray (24 records), minke (19 records), southern right (15 records), and sperm whales (17 records). Far fewer reports exist of strikes to blue (8 records), Bryde's (3 records), sei (3 records) and killer whales (1 record). Several collision incidents were identified as a general baleen whale (3 records of strike), while a large proportion of reported strikes were not identified to species (42 unknown records). Coastal species (e.g., right and humpback whales) may be over represented in the database, due to a greater likelihood of near-shore detection of a ship struck carcass than individuals that may have died at great distances from shore.

These records indicate that North Atlantic right whales are one of the most frequently hit species of large whale. World-wide, 53 right whales have been victim to vessel strikes (38 from the North Atlantic population, 15 from the southern hemisphere). Five of these were calves and six were juveniles.

Severity of Strike

Of the total 292 large whale ship strike reports, 48 (16.4%) resulted in injury to the animal and 198 (68.0%) were fatal. Thus, in a total of 246 (84.3%) records, animals that were hit or bear evidence of ship strike were in fact injured or killed by the interaction. This high injury and mortality figure for all whales in the database includes numerous records of stranded or floating animals found dead, fatalities presumed and confirmed due to ship strike. In contrast, the injury and mortality figure for definitive ship strikes with known speeds is lower, 65%, likely due to the exclusion of the records of stranded and floating whales.

Type of Vessel

Collisions between ships and whales are associated with a wide variety of vessel types. From our database, 134 (46%) of 292 cases of ship strike include vessel type in the report, while in 158 (54%) cases the type of ship was unknown. Of the 134 known cases of vessel type, there are 23 reported incidents (17.1%) of Navy vessels hitting whales, 20 reports (14.9%) of ship strike for container/cargo ships/freighters, 19 (14.2%) reports involving whale-watching vessels, and 17 reports (12.7%) for cruise ships and liners. Sixteen (11.9%) reports are attributed to ferries, and

nine cases (6.7%) are reported for Coast Guard vessels. Eight (6.0%) cases are reported for tankers, while recreational vessels and steamships account for seven collisions each (5.2%). Fishing vessels were responsible for four collisions in the database (3.0%), and one collision (0.75%) was reported from each of the following: dredge, research vessel, pilot boat and whaling catcher boat. It should be noted that the high incidence of Navy and Coast Guard collision reports may be largely a factor of standardized military and government reporting practice rather than an actual higher frequency of collisions relative to other ship types. Although these data give valuable information regarding the wide range of vessels involved in collisions, care should be taken in extrapolating from these numbers. As noted earlier, many large ships, such as containers, tankers, and cruise ships, may not be aware that a collision with a whale has occurred and thus do not report the incident. It is also likely that ships of all sizes under no authority to report, in fact, do not, out of apathy or fear of enforcement consequences.

Vessel Damage and Mariner Safety

The regulation of speed is a relevant issue not only for the safety of whales, but the safety and economic interests of mariners as well. Thirteen records indicate damage to the vessel (as reported by the vessel), ranging from minor to extreme, as a result of impact with a vessel operating at or greater than 10 knots. Three cases were at speeds between 10-15 knots, while the remaining reports of damage occurred at speeds over 20 knots.

Many of these ships report damaged propellers, propeller shafts and rudders. In one case, an Alaskan whale-watching vessel traveling at 22 knots lost a port stabilizer in a collision. In another case, a high-speed ferry traveling around 30 knots in the French Mediterranean broke a T-foil and arrived in port two hours late as a result of a collision with a whale. On August 11, 1998, an 8 m recreational Bayliner hit a humpback whale outside Juneau, Alaska at 12 knots, resulting in a cracked hull. A 126 m Navy frigate sustained significant damage when it struck an undetermined whale species off southern California. "Divers sent down to survey the hull reported...a 1.6 m tear in the leading edge of a propeller blade. The propeller had to be replaced at a cost of $125,000." By far the most extreme example was that of a 24 m Navy hydrofoil which hit an undetermined whale species at a speed over 40 knots on April 16, 1991 off Key West, Florida, resulting in $1 million in damage. "Port and starboard aft strut actuators were severely damaged, port and starboard steering arms broke, ruptured seawater piping caused flooding of the gas turbine, the hull was warped in numerous places, and starboard diesel engine shifted forward off its mounts." (Laist et al. 2001).

In addition to vessel damage, collisions can pose a hazard to human safety. In several cases of collisions, particularly with small vessels and fast-moving vessels (e.g., ferries), passengers have been knocked off their feet or even thrown from the boat upon impact with a whale. Hazards to human safety can be even more severe; thus, ship/whale collisions are not necessarily only fatal for the whale. Laist et al. (2001) list a case in February 1992 in the Canary Islands in which a high-speed ferry collided with a sperm whale at 45 knots, killing it and reportedly killing one passenger as well. Thus, the issues of vessel damage and mariner safety should be given serious consideration in the development of a ship strike strategy. From the data available, it appears that

most damage and injury occur from vessels striking whales at higher speeds; therefore this factor should be noted in considered when developing speed restrictions to minimize the severity of collisions for both whales and humans.

4. Discussion

Distribution of whales and ships

One of the greatest factors contributing to ship/whale collisions may be the overlap of right whale distribution and vessel traffic densities. As a highly coastal species, right whales spend much of their time in areas where vessels concentrate because of entry into ports and other factors. The population migrates along the continental shelf of the eastern seaboard between foraging areas in the northeastern U.S. and Canada and breeding/calving areas in the southeastern U.S. Their primary concentrations are found in Cape Cod Bay, the Great South Channel, the Bay of Fundy and the coastal waters of Georgia and Florida.

In the United States, annual use of these habitats precipitated the designation of critical habitat for right whales in Cape Cod Bay, the Great South Channel and the waters off the eastern coasts of Georgia and Florida. Although some protection is afforded by the federally designated critical habitat, these are also areas of high ship traffic. No regulation currently exists for shipping in these designated zones, although a Mandatory Ship Reporting (MSR) system was implemented in 1999 that requires mariners to report such things as their location, course, speed, and destination when entering the reporting areas. In return, mariners receive information on right whale distribution, vulnerability to ship strikes, steps to avoid collisions, as well as real-time information about status and locations of right whales in the area. Although the MSR is a valuable tool for raising mariner awareness and examining ship traffic patterns, it is not a stand alone solution for whale-ship collisions.

Furthermore, ship strikes of right whales do not necessarily occur within the boundaries of the MSR or critical habitat. The entire Atlantic seaboard is highly trafficked by both whales and ships. Right whales migrate along the east coast of the U.S. and Canada in near-shore waters, and vessels of all sizes and types (tankers, container ships, cruise ships, fishing vessels, whale-watch vessels, private yachts, Navy vessels and Coast Guard cutters) transit these same waters. Particular areas of high overlap include the ports of Halifax, Boston, New York, Baltimore/Washington and Jacksonville and numerous other harbor entrances.

Whale Behavior

It is difficult to determine whether and at what distance whales may be able to detect and avoid ships. Some studies indicate that large whales do change behavior and exhibit avoidance in response to vessels, while evidence from other studies shows little or no apparent behavioral change. In 1981 and 1982, Baker and Herman (1989) studied vessel impacts on humpback whales in Southeast (SE) Alaska and concluded that changes in whale behavior were significantly correlated with vessel number, speed, size and proximity. In a more recent study of humpback behavioral responses to vessels in SE Alaska, focal animals were rarely found to respond to

vessels with avoidance behavior (Peterson, MS Thesis 2001).

In the case of right whales, when animals are engaged in mating or feeding activities they appear oblivious to passing vessels, particularly if there is not an abrupt change in engine speed or course (Richardson et al. 1995). Likewise, blue and Bryde's whales have been observed to be unresponsive to passing ships, and fin whales off Cape Cod were found to ignore slowly approaching boats, of varying sizes, that maintained a steady speed. Reactions have been observed when boats changed speed or direction, or made fast, erratic approaches. Generally, it appears that baleen whales often ignore low-level sounds from distant vessels; more often, they exhibit avoidance behavior when vessel noise or speed changes, particularly when the vessel is heading directly toward them (Richardson et al. 1995). Avoidance reactions may include interrupting normal behavior, diving, or swimming rapidly away from approaching vessel. Some whales attempt to avoid an approaching vessel by outrunning it, which is often ineffective for slow-swimming species like right whales that can only swim at speeds of up 8 knots in short bursts (15km/h) (Cummings et al. 1972). Right whales are not, however, able to maintain these speeds for sustained periods, and any ship traveling at a speed of 14-20 knots (25-40 km/h) would easily overtake a right whale (if the animal is swimming directly in the same path as the ship). Clearly, not all avoidance reactions are successful in preventing collisions, injury and mortality. That is, a decision to flee directly away from an oncoming ship may not necessarily be the most desirable avoidance behavior.

Not only are right whales unlikely to horizontally outswim a ship, they may not be able to vertically avoid an approaching vessel. Recent research using new technology, a digital acoustic recording tag (DTAG), indicates that right whales may be limited in their ability to react to vessels by their positive buoyancy and reduced maneuverability during an ascent from a dive (Nowacek et al., 2001). The DTAG is attached to the whale and records swim stroke and pitch angle of the animal's swimming and diving activities. Data from recovered tags from right whales indicated that the animals were using muscular effort (fluke thrusts) to dive, but glided when ascending. This glide when surfacing is largely powered by the high amount of positively buoyant tissue (blubber) in right whales. Even if a ship were detected, this type of passive ascent might hinder the whale's ability to respond, react and effectively avoid a collision. Furthermore, results show that right whales may not only be limited by their maneuverability in *ascent*, but also in their ability to *descend*. Near the surface, right whales are positively buoyant and as a result may have difficulty counteracting this to dive quickly to avoid an oncoming vessel. These characteristics may explain, in part, why this species is so highly vulnerable to ship strikes (Nowacek et al., 2001). In addition, the positive buoyancy of the species itself suggest that these whales are prone to spending extended periods at the surface, when at rest, for example.

The Status of Vessel Traffic: Increasing Numbers and Speed

Generally, shipping speeds are on the rise world-wide. As human population continues to grow and commerce becomes increasingly globalized, so too does the demand for more ships which can travel faster and transport cargo more economically. Already it is expected that oceangoing freighters may soon double their speeds with new designs. Recently developed 'FastShips' can

sail twice as fast as traditional freighters due to innovative hull design and high-powered propulsion system (Giles 1997). As a result, cargo between the U.S. and Europe may cross the Atlantic in days rather than weeks. Another concept currently under development is a hybrid catamaran and surface effect ship (SES), which, if successful, will lead to larger fast ferries and other high-speed vessels. This design, subject to extensive sea trials after receiving a 1996 patent, boasts high speed at low power, a low resistance hull, low wash and smooth travel (Anon. 1998). In the San Francisco Bay, the number of fast ferry traffic and vessel speed are both on the rise, with estimates of daily fast ferry trips increasing from 100+ trips at present to 665 trips daily in the next 10 years (Walther and Aspland 2001). High speed ferries (e.g., the "Cat") now make routine trips in areas and during periods when right whales aggregate in Northeast U.S. and Canadian waters. On the U.S. east coast, Blount-Barker Shipbuilding has begun development of a new high-speed catamaran to operate out of Bar Harbor, Maine (pers comm.). The vessel will conduct both seasonal whale-watch tours and high-speed commuter service at loaded operating speed of 40 knots.

Thus, as the capability to design and build fast ships rises to meet the demand for increased commerce and tourism, increased vigilance is necessary to safeguard marine wildlife, especially right whales, which are vulnerable ship strikes and in particular high speed craft.

Existing Speed Regulations

Terrestrial

Vehicle speed limits have traditionally been used to protect humans and terrestrial wildlife. In one study in Yellowstone National Park, 939 large mammals were killed on roadways in eight years, and there were numerous threatened and endangered species among them (Gunther et al. 1998). Overall, more than 14 species of wildlife were killed by vehicles on park roads, while park visitors also were injured and killed by collisions with wildlife. During the study, researchers analyzed the frequency of roadkills in relation to speed limits and actual average speed of vehicles. They found that vehicle speed was the primary factor contributing to vehicle-wildlife collisions.

Concern by resource agencies over the relationship between increased vehicle speeds and wildlife mortalities has led to mitigation attempts in the construction of new roads. In the case of Yellowstone, a study is being conducted to learn more about the mitigation effectiveness of the Wyoming Department of Transportation's plans for new road construction. The Agency's theory is that wider shoulders and lanes will provide the driver more sight distance and width to react to wildlife in the road, thereby reducing collisions (Bonds 1996). Vehicle-wildlife collision mitigation is also being attempted in the Canadian Rocky Mountains in Alberta where transportation infrastructure threatens seven native large carnivore species. Overpasses and buried, culvert-style underpasses have been built along sections of road as wildlife crossings (Gibeau and Heuer 1996).

Marine

Attempts to reduce impacts from vessels, such as speed restrictions, have been used to protect marine species. Currently, speed regulations exist for two endangered marine mammal species in U.S. waters: manatees and humpback whales. Vessel collision is the principle threat to the recovery of the West Indian manatee (*Trichechus manatus*), which congregates in coastal waters along the east coast of Florida and Georgia. Most deaths are caused by vessel impact, followed by propeller cuts, while many living manatees bear scars or wounds from vessel strikes. Over the last 25 years, a clear increase in mortality has been noted in the manatee population in the southeastern U.S., largely attributable to watercraft collisions (USFWS 2001). Between 1976 and 2000, deaths caused by watercraft collisions increased by 7.2% per year; as a result, boat speed regulations have been implemented in areas with high manatee concentrations along the east coast of Florida. The Florida Manatee Recovery Plan (2001) states, *"Because watercraft operators cannot reliably detect and avoid hitting manatees, federal and state managers have sought to limit watercraft speed in areas where manatees are most likely to occur to afford both manatees and boaters time to avoid collisions."* In 1989, in an effort to improve manatee protection in 13 counties, the governor and Cabinet of Florida approved conservation recommendations from the Florida Department of Natural Resources. Currently, state and local governments have plans to cooperate in building and implementing four county Manatee Protection Plans and 12 county-wide manatee protection speed zones rules (USFWS 2001).

The Florida Fish and Wildlife Conservation Commission has the responsibility to develop and maintain state waterway speed and access regulations to protect manatees under the State of Florida Manatee Sanctuary Act. These rules aim to protect manatees by taking into account manatee habitat use patterns and the needs of watercraft users. Under the authority of the ESA and MMPA at 50 CFR 17, the U.S. Fish and Wildlife Service may restrict vessel speed and access in conjunction with efforts to designate manatee protection areas (USFWS 2001). For example, in Brevard Country, historically one of the Florida counties highest in boat-related manatee deaths, slow speed zones and manatee sanctuaries have been adopted in an effort to reduce injury and mortality. Boater compliance with speed regulations has been examined through water-based surveys and aerial surveys with respect to boat type, activity, time and location (Morris et al. 1995).

In Alaska, a vessel speed limit is enforced in Glacier Bay National Park for protection of the endangered North Pacific humpback whale (*Megaptera novaeangliae*). Humpback whales feed in several areas throughout southeast Alaska during summer, but the waters of Glacier Bay are the only area in which a speed limit in enforced. Vessel operating restrictions are intended to minimize disturbance to the whales and lower the risk of vessel/whale collisions. In the past, a 20 knot speed limit was mandatory in the lower Bay from May 15 to August 31, and could be dropped to a 10 knot speed restriction by the park superintendent during times of high whale densities throughout summer months (Glacier Bay Boating Regulations 2002).

More recently, the Park Service analyzed its vessel operating requirements through a 2003 Environmental Impact Statement (EIS). The Park Service EIS Record of Decision (ROD) revised

previous vessel requirements to mandate that a 13 knot speed limit for vessels greater than or equal to 262 ft (80 m) be in effect as needed in Glacier Bay on a year-round basis. The ROD states "The Superintendent may impose a 13-knot speed limit, as necessary, for motor vessels greater than or equal to 262 feet (80 meters) in length throughout Glacier Bay due to the presence of humpback whales. Park Service staff will monitor whale abundance, movements, and distribution, and provide this information to the park superintendent, who will then determine whether to set a 13-knot speed limit for vessels of this length or greater." (Glacier Bay Vessel Quotas and Operating Requirements EIS 2004). In the appendix of supporting materials, the EIS includes a Biological Opinion prepared by NOAA Fisheries that cites Laist et al. 2001 as a basis for this speed restriction: "Generally, there is a direct relationship between the occurrence of a whale strike and the speed of the vessel involved in the collision. Most mortalities that have been documented occur when a vessel is traveling in excess of 13 knots (Laist et al. 2001)." (NMFS 2003)

In 2000, NOAA Fisheries in Alaska proposed a regional 200 yard approach rule for humpback whales. The number of responsive comments on the proposed rule was extremely high, with many commenters emphasizing, in particular, the need for vessel speed limits in areas where whales are predictably found. They recommended that NOAA implement speed limits through guidelines or regulations. Likewise, the recommendations from a recent study of humpback whale behavior and vessel activity in SE Alaska also urged NOAA Fisheries to consider speed limits in areas of high whale concentration. This study recommended that the Glacier Bay National Park restriction of 10 knots in "whale waters" be replicated in other seasonal humpback whale "hotspots" throughout Alaska to reduce the risk of vessel strike or harassment (Peterson, MS Thesis 2001).

Internationally, vessel speed limits have also been recommended for the protection of marine species. In Australia in 1999, the Great Barrier Reef Ministerial Council, committed to not only halting the decline in dugong numbers but actually restoring populations by endorsement of the recommendations of a dugong conservation review that included implementing boater speed limits (Anon. 1999).

Hydrodynamics

Vessels in transit exert hydrodynamic forces which can draw in whales and result in injury or mortality. To better understand the physical forces around a moving ship, Knowlton et al. (1995) conducted a computer simulation study to examine the effects on the body of a whale from the forces created by pressure fields as water moves around a ship's hull. In addition to the hydrodynamic forces computed for the ship, the simulation was extended to calculate the movement of the whale in relation to the passing ship.

The simulations used three forces which may act on a whale from a passing ship: sway, surge and yaw. Sway is the lateral force, surge is the longitudinal force and yaw is the horizontal movement. These forces generally increase with the square of the ship speed and a decrease in water depth. In the simulation with whales at various distances from the side of the vessel, the

initial positive force induced by the passing bow pushed the whale away from the ship. The subsequent negative sway force then drew the whales back in toward the ship's path. The timing of when a whale actually arrived in the path of the ship varied with the initial distance between ship and whale. If within a certain distance threshold, the whale is nearly always struck by the ship. If the whale's initial position is at an even closer threshold, it is likely a collision would result. An additional simulation indicated that if a whale surfaced in proximity to a passing ship and was not subjected to the initial positive force, the animal would be drawn in to the ship and collision would result. The maximum distance at which a whale could be drawn in toward the ship has not been determined, but most likely depends on water depth and ship speed.

Although different vessel types exert unique levels of force on whales, in general, an increase in speed increases the forces acting on the whale. Thus if the speed of a vessel increases, the whale will be drawn in more quickly (Knowlton et al.1995).

To accurately model and predict ship speed impacts on whales, a discussion of whale behavior must be included. For instance, if a whale attempts to avoid a passing ship, it can escape by swimming left, right, or straight up or down. The viability of these options will depend, for instance, on whether the incident is occurring in shallow or deep water. If right whales are indeed cognizant of the danger of approaching vessels and exhibit avoidance behavior, then speed reduction may be beneficial by reducing the hydrodynamic forces imposed on the whale and providing a longer reaction time to escape the danger zone (Knowlton et al.1995)

Ship Strike Simulations

Very few studies have been conducted which relate directly to speed in incidents of ship strikes to whales. In addition to the previously described hydrodynamic study, an additional computer simulation by Clyne (1999) was conducted to investigate right whale interactions with ships. By analyzing the size, movement and speed of both ships and whales in simulation, results showed the change in relative proportion of whale collisions with different parts of the ship against changes in ship speed. Based on this modeling, the study showed that the proportion of whale collisions with the side of a vessel decreased as speed increased, collisions with the bottom of a vessel stayed relatively even with change in speed, and the proportion of collisions with the bow of a vessel increased as speed increased. Thus it is evident that hydrodynamic and spatial factors play an important role in collision dynamics; ship strike incidents are more complex than the simple fact of a vessel hitting a whale. It is important to note from the results that the proportion of collisions with the bow of the ship increased at higher speeds; thus, it is possible that vessel speed reductions could mitigate incidents of head-on ship strikes to whales.

Perspectives from the Shipping Industry

Generally, various sectors of the maritime industry have argued simply that if mariners know where whales are located, they will avoid them. Most are looking for real-time information, and many advocate management measures that are entirely dynamic (i.e., nothing permanent). Speed reduction is not a measure that is readily envisioned or accepted, but neither is it universally

opposed. The following discussion attempts to synthesize perspectives gathered by industry liaisons in response to this issue.

Support

Not all sectors of the shipping industry are opposed to speed restrictions. Many support geographically and temporally targeted speed restrictions based on real-time observations. Several shipping companies that operate along the U.S. east coast and Canada have indicated that they would willingly adjust their schedules for a port entry speed restriction. Some members of the shipping industry have communicated that a 10 knot speed during a seasonal 20 nm port entry/exit restriction is agreeable, while many others advocate a 13 knot seasonal restriction for port entry/exit . One northeast industry representative indicated support for speed restrictions based on the frequency of occurrence, duration and expected small areas where restrictions would likely be imposed. Another northeast representative indicated that speed restrictions will not affect commerce, as few ships are on such a tight schedule that a reasonable limit on a speed would disrupt their activities, especially since a speed limit will be known and can be taken into account in voyage planning. A marine pilot from the northeast advocated speed reduction as the sole management tool since it is the approach that allows the master an alternative and the scheduler a constant. A manager for a southeast port indicated that slowing vessels is the only viable solution to the problem of right whale ship strikes. Predictable areas of speed reduction can ultimately be factored into vessel scheduling and would not then be considered 'delays'.

Speed restrictions around port entrances may be easier to implement and encounter less opposition than, for instance, a designated route that may cause a ship to deviate off its course and cost the ship more time than a speed restriction. In their current operations, vessels are already typically slowing to 6-10 knots to approach pilot buoys outside harbor entrances. In some ports, vessels slow to 5-8 knots to pick up marine pilots. In addition, vessels often slow to switch to lighter fuel during port approach to allow for increased maneuverability.

Opposition

Industry representatives have argued that there is little or no evidence that speed restrictions will actually provide protective measures for right whales. Indeed, there is only limited information on the speeds of vessels when ship strikes occurred. Experiments to injury and mortality at varying speeds are not possible. However, several hydrodynamic studies indicate that speed is a causal factor in ship strikes. It is known that four forces may act on a whale from a passing ship. First, the whale is initially pushed out of a ship's path by the bow wake, and secondly, it is pulled back in. The third force is that of the propeller, which at higher speeds has a higher negative pressure forward of the propeller. A whale can get sucked into the propeller. The fourth force is below the vessel; the faster a vessel moves through the water, the greater the negative pressure below the keel. Several hydrodynamic studies (Knowlton et al, 1995; Clyne, 1999) that model the bow wave/right whale interaction indicate that speed is likely a causal factor in ship strikes. As a result of these hydrodynamic forces, it is likely that at higher speeds a right whale will be pushed out of the way of a vessel and then drawn back in, whereas at slower speeds a whale is less likely to be drawn in.

Industry also argues for "slow, safe speed," a COLREGS definition that leaves discretion to the mariner, rather than regulating vessels at specific speeds. This term has been mis-used in the past by NOAA Fisheries, the U.S. Coast Guard and the U.S. Navy in their whale watch regulations, environmental impact statements and field guidance, respectively. Slow, safe speed is not defined in the COLREGS; safe speed, however, is defined, but is used in vessel to vessel collision guidance. In utilizing safe speed, a mariner considers weather, sea conditions, visibility, the vessel's ability to maneuver and other factors. Presumably other mariners are considering the same variables. In leaving the definition of safe speed up to individual interpretation, it is likely to be the normal operating speed, because no mariner will want to be put at a competitive disadvantage vis–a-vis other ships that might determine safe speed to be normal operating speed. A prescribed speed will provide consistent, definitive guidance to mariners in an effort to mitigate ship collisions with right whales.

In general, opposition from shipping associations and ports is based on potential economic impacts, coupled with the lack of definitive evidence showing that slowing ships will result in greater protection for right whales. Economic impacts are of great concern in the highly competitive shipping industry. Competition among ports is based not only on ship costs, but also on rail and highway access, connecting inter-modal costs, federal and state taxes, labor costs and supply, port capacity, and state and local incentives. In addition, many ports struggle to maintain their existing client base. The issue of port dislocation resulting from speed restrictions is a significant concern for port authorities and shipping interests. In developing markets to attract shipping companies, some port authorities argue that imposed delays, i.e, additional time to call at a port, will put them at a competitive disadvantage. Ports raising the greatest level of concern have significant RO-Ro and container ship traffic. Other vessel types that are on time sensitive schedules include cruise and LNG vessels. Other concerns voiced relate to companies that have signed contracts at fixed prices and to the additional transit times that may not have been factored into existing contracts.

Technological solutions, rather than speed restrictions, are advocated by industry to address ship strikes. Industry representatives ask why an answer cannot be found in tagging whales or in acoustic detection, both ship-board or along designated shipping lanes. Interest is so great that industry in the northeast has even offered to provide platforms for testing acoustic detection prototypes. However, it is widely accepted throughout scientific and management sectors that these methods currently do not represent viable means to address right whale ship strikes. Furthermore, if these techniques were to be used, the actions to follow would most probably result in speed or routing changes. Consider that a tagged whale is detected and the information relayed to a mariner. Likewise, consider right whale vocalizations heard using passive acoustics technology and conveyed to a ship in the vicinity. How will these masters respond? The only alternatives available to them if they are to change their operations in the presence of right whales are the same alternatives available to the agency: slow down, route around the animal or re-route and slow down. Thus, whether technology is used or not, the impact to the mariner may be largely the same when a right whale (s) is encountered. Speed is one of the few factors in vessel

transit that can be controlled. Moreover, it is the only measure, in some instances, that is available to reduce the risk. Thus, it is necessary to consider it as a management measure to reduce right whale ship strikes.

Enforcement
NOAA Fisheries is considering the issue of enforcement while formulating a strategy to address right whale ship strikes. Many question the enforceability of vessel speed restrictions, and thus, the effectiveness of such a management measure. This is indeed a valid concern and clearly a challenge for the agency. Depending upon where possible speed restrictions are implemented, means to support these regulations may involve using USCG or NOAA Office of Law Enforcement vessels to monitor harbor approaches, critical habitat and other select areas with high right whale concentrations. Additionally, vessel speed limit enforcement could be achieved using aircraft, GPS, and via the USCG Port State Control inspection dockside. Vessel logs and MSR reports can be reviewed dockside. The Automated Identification System (AIS) (Title 33 CFR 164.46) will be in effect by the end of 2004 and another possible enforcement tool.

In Florida, an effort to reduce manatee injury and death and increase boater compliance within speed zones, both federal and state agencies have used targeted enforcement practices. The U.S. Fish and Wildlife Service strategy has been to allocate enforcement personnel to specific areas with significant histories of manatee deaths due to vessel collision. Emphasizing these sites, enforcement teams travel around the state of Florida. Likewise, the Florida Fish and Wildlife Conservation Commission has increased its emphasis on enforcement of manatee speed zones by adding additional officers, increasing overtime and increasing the proportion of law enforcement time directed toward manatee conservation efforts (USFWS 2001).

Furthermore, improved data collection and processing associated with high resolution spatial technologies will soon make it possible to determine ship speed by satellite. With further development of remote sensing technology, synthetic aperture radar (SAR) will be able to determine ship speed from the images of ships' wakes. In addition, SAR will be able to remotely calculate hull characteristics such as length and volume, hypothetically presenting a method to "enforce" vessel speed and determine identity (Griffin et al. 1996). These types of strategies, or similar strategies, will be explored for right whales.

5. Conclusion
The number of options available to effectively reduce ship strikes are few. As noted earlier, ideal measures would minimize the overlap of whales and ships. In many instances, this is impractical or impossible for both economic and biological reasons. That is, marine safety, detection capabilities, and economic factors may prohibit routing ships away from areas of whale occurrence. Thus, the manager and decision-maker must resort to the limited options available. Reducing speed is among the few viable options.

Although there are uncertainties, it is possible to assume certain things. Slowing ships may give more time for a whale to detect and possibly avoid the low-frequency sounds of an approaching

vessel. As discussed, ships operating at reduced speed may be less likely to impose strong hydrodynamic forces on whales which otherwise might pull whales into the path of a ship. Additionally, slower vessel speeds may give a whale more time to detect, react and avoid a vessel. Finally, collision at a slower speed results in less actual impact (physical force) to the whale and to the vessel. This may spell the difference between mortality and less serious injury for the animal, and likewise, the difference between damage to the vessel or not.

Information in the Jensen and Silber (2003) database and Laist et al. (2001) indicates that the majority of vessel collisions with whales occurred at speeds between 13-15 knots. Overall, most ship strikes of large whale species occurred when ships were traveling at speeds of 10 knots or greater. Only 12.3% of the ship strikes in the Jensen and Silber database occurred when vessels were traveling at speeds of 10 knots or less. While vessel speed may not be the only factor in ship/whale collisions, or even the primary factor, data indicate that collisions are more likely to occur when ships are traveling at speeds of 14 knots or greater. This strongly suggests that ships going slower than 14 knots are less likely to collide with large whales. Therefore, NOAA Fisheries recommends that speed restrictions in the range of 10-13 knots be used, where appropriate, feasible, and effective, in areas where reduced speed is likely to reduce the risk of ship strikes and facilitate whale avoidance.

Some opponents to speed and routing management measures argue that a solution to the issue of right whale vessel strikes lies in educating mariners and/or outfitting ships with alarms and other technologies to warn whales. Although raising mariner awareness is an important facet of the ship strike strategy and something NOAA Fisheries has been actively engaged in for years, it is clear that ship strike and whale avoidance management must be addressed and not simply left to the vessel operator. In the Laist et al (2001) review of ship collisions, accounts indicate that most whales hit by ships were not seen beforehand or only seen at the last moment. Thus, collision avoidance strategies which rely on "mariner discretion" may be ineffective for large ships with limited maneuverability.

Likewise, just as NOAA Fisheries cannot rely on the mariner to react to potential collision situations, we cannot rely on the whale to avoid an approaching ship successfully. Since right whales engaged in feeding, mating or other social behaviors often appear oblivious to nearby vessel traffic, it cannot be assumed that they will avoid an approaching vessel, even if it were outfitted with alarms. In addition, in certain cases right whales may be *unable* to avoid the path of a ship due to hydrodynamic forces exerted upon them, their positive buoyancy and their lack of maneuverability during ascent. Because of these reasons, NOAA Fisheries believes measures to implement speed restrictions and/or re-route ships in specified areas are likely to be the most successful mechanisms to reduce the threat of ship strikes of right whales.

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Exhibit D

Exhibit D

RECOVERY PLAN FOR THE BLUE WHALE

(*BALAENOPTERA MUSCULUS*)

Prepared by

Randall R. Reeves, Phillip J. Clapham,
Robert L. Brownell, Jr., and Gregory K. Silber

for the

Office of Protected Resources
National Marine Fisheries Service
National Oceanic and Atmospheric Administration
Silver Spring, Maryland

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Approved: ______________________________________
Assistant Administrator for Fisheries

Date: ________________

Recovery plans identify reasonable actions which are believed to be required to recover and/or protect endangered species. Plans are prepared by the National Marine Fisheries Service (NMFS) and the U.S. Fish and Wildlife Service (FWS) and sometimes with the assistance of recovery teams, contractors, State agencies, and others. This plan was prepared by Randall R. Reeves, Phillip J. Clapham, Robert L. Brownell, Jr., and Gregory K. Silber for NMFS. Recovery plans do not necessarily represent the views nor the official positions or approvals of any individuals or agencies, other than those of NMFS, and they represent the views of NMFS only after they have been approved by the Assistant Administrator for Fisheries. Objectives will only be attained and funds expended contingent upon appropriations, priorities, and other budgetary constraints. Approved recovery plans are subject to modification as dictated by new findings, changes in species status, and the completion of recovery tasks described in the plan.

Literature citation should read as:

National Marine Fisheries Service. 1998. Recovery plan for the blue whale (*Balaenoptera musculus*). Prepared by Reeves R.R., P.J. Clapham, R.L. Brownell, Jr., and G.K. Silber for the National Marine Fisheries Service, Silver Spring, MD. 42 pp.

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PREFACE

Congress passed the Endangered Species Act of 1973 (16 USC 1531 *et seq*) (ESA) to protect species of plants and animals endangered or threatened with extinction. NMFS and the U.S. Fish and Wildlife Service (FWS) share responsibility for the administration of the Act. NMFS is responsible for most marine mammals including the blue whale. This Plan was written at the request of the Assistant Administrator for Fisheries to promote the conservation of blue whales.

The goals and objectives of the Plan can be achieved only if a long-term commitment is made to support the actions recommended here. Achievement of these goals and objectives will require the continued cooperation of the governments of the United States and other nations. Within the United States, the shared resources and cooperative involvement of federal, state and local governments, industry, academia, non-governmental organizations and individuals will be required throughout the recovery period.

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EXECUTIVE SUMMARY

The world's stocks of blue whales, *Balaenoptera musculus*, were depleted by modern whaling, and the number of blue whales in the world's oceans is now only a small fraction of what it was early in the 20th century. Since gaining complete legal protection from commercial whaling in 1966, some populations have shown signs of recovery; others have not been adequately monitored to determine their status. Blue whales are listed as endangered under the Endangered Species Act.

Although the species is often found in coastal waters, blue whales are thought to occur generally more offshore than northern right (*Eubalaena glacialis*) and humpback (*Megaptera novaeangliae*) whales. Perhaps largely because of its offshore distribution, the blue whale seems less prone, although not immune, to lethal entanglements in fishing gear and lethal strikes by vessels. Moreover, its principal prey, euphausiids, are not commercially exploited on a large scale in the Northern Hemisphere.

Collisions with vessels, entanglement in fishing gear, reduced zooplankton production due to habitat degradation, and disturbance from low-frequency noise are the most obvious potential indirect threats. Thus, unlike the more piscivorous baleen whales (e.g., the humpback whale, fin whale, *Balaenoptera physalus*, minke whale, *B. acutorostrata*, and Bryde's whale, *B. edeni*), the blue whale in the Northern Hemisphere is probably not yet competing directly with humans for prey resources.

The long-term goal of this Plan is to promote the recovery of blue whale populations so that it becomes appropriate to remove them from the list of Endangered and Threatened Wildlife under the Endangered Species Act. The Plan identifies measures that must be taken to protect and monitor the recovery of blue whale populations in the North Atlantic and North Pacific oceans. The key recommended actions of the proposed recovery program for the blue whale are to: (1) determine population structure of blue whales, (2) estimate population size and monitor trends in abundance, (3) identify and protect essential habitats, (4) minimize or eliminate human-caused injury and mortality, (5) coordinate state, federal, and international actions to implement recovery efforts, (6) determine and minimize any detrimental effects of directed vessel[1] and aircraft interactions, and (7) maximize efforts to acquire scientific information from dead, stranded, and entangled animals. Criteria for delisting or downlisting recovering blue whale populations do not exist and developing them is one of the recommended actions.

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[1] Vessel includes every description of water craft, including nondisplacement craft and seaplanes, used or capable of being used as a means of transportation on water.

I. BACKGROUND

A. Species Description and Taxonomy

The blue whale, *Balaenoptera musculus* (Linnaeus 1758), is a cosmopolitan species of baleen whale (Gambell 1979; Yochem and Leatherwood 1985; Mead and Brownell 1993). It is the largest animal ever known to have lived on Earth: adults in the Antarctic have reached a maximum body length of about 33 m and can weigh more than 150,000 kg. Blue whales in the Northern Hemisphere are generally smaller than those in the Southern Ocean. True (1904), for example, concluded that maximum body length in the North Atlantic was about 27 m (89 ft) (although a 28.1 m [92 ft] blue whale is reported in whaling statistics from Davis Strait; R. Sears, pers. comm., October 1997). The largest blue whales reported from the North Pacific are a female that measured 26.8 m (88 ft) taken at Port Hobron in 1932 (Reeves *et al.* 1985) and a 27.1 m (89 ft) female taken by Japanese pelagic whaling operations in 1959 (J. Gilpatrick, pers. comm., June 1998). As is true of other baleen whale species, female blue whales are somewhat larger than males (Ralls 1976).

Blue whales are long-bodied and slender in comparison, for example, to right whales. The dorsal fin is proportionately smaller than those of other balaenopterid whales. It is also set far back, nearer to the tail flukes than to the middle of the body. Viewed from above, the blue whale has a broad, flat rostrum. When a blue whale is feeding, its pleated throat and chest area expands to accommodate the enormous intake of seawater and food. As the water is expelled and the filtered zooplankton are swallowed, the body outline returns to its characteristically slender shape. Blue whales have a mottled gray color pattern which appears light blue when seen through the water. The background color can be dark gray, interrupted by irregular light gray markings, with dark gray splotches.

Studies of intraspecific variability have led to the designation of three subspecies (Rice 1977): *B. m. musculus* in the Northern Hemisphere; the somewhat larger *B. m. intermedia* from the Antarctic; and *B. m. brevicauda*, the so-called "pygmy" blue whale, a significantly smaller and morphologically distinct form found in the subantarctic zone of the southern Indian Ocean and southwestern Pacific Ocean (Ichihara 1966). There is also a "resident" population of blue whales (of unknown taxonomic status) in the northern Indian Ocean from the Gulf of Aden east at least to the Bay of Bengal. This population was named *Balaenoptera indica* by Anderson (1879). Some of the uncertainty regarding the blue whale’s conservation status, as a species, resides in the problem of distinguishing among the subspecies and populations. Obviously, when the current numbers of all three subspecies are combined, the total world population of blue whales is larger than if one refers only to the numbers of one subspecies or population.

B. Zoogeography

Although the populations of blue whales were severely depleted by whaling, no evidence is available to suggest that this exploitation resulted in a major change in their distribution during modern times. Possible exceptions are in the eastern North Atlantic (Christensen et al. 1992a) and

western North Pacific (Forney and Brownell 1997; see below). It is assumed that blue whale distribution is governed largely by food requirements and that populations are seasonally migratory. Poleward movements in spring allow the whales to take advantage of high zooplankton production in summer. Movement toward the subtropics in the fall allows blue whales to reduce their energy expenditure while fasting, avoid ice entrapment in some areas, and engage in reproductive activities in warmer waters of lower latitudes.

Separate summaries of natural history and human impacts are provided in this Plan for blue whales in the North Atlantic and North Pacific oceans. However, since management needs in the two ocean basins are similar, the Plan treats the two areas together when summarizing conservation efforts and recommended actions.

C. Protective Legislation

Blue whales were only occasionally hunted by the sailing-vessel whalers of the 19th century (e.g., see Scammon 1874). The introduction of steam power in the second half of that century made it possible for boats to overtake the large, fast-swimming blue whales and other rorquals; yet it remained for deck-mounted harpoon cannons to be developed for killing and securing them on an industrial scale. Most of the technology for "modern" whaling was available by the early 1870s, and factory ships were added in the early 20th century (Tønnessen and Johnsen 1982). Thus, from the turn of the century until the mid-1960s, blue whales from various stocks were intensively hunted in all the world’s oceans.

Blue whales were protected in portions of the Southern Hemisphere beginning in 1939. In 1955 they were given complete protection in the North Atlantic under the International Convention for the Regulation of Whaling; this protection was extended to the Antarctic in 1965 and the North Pacific in 1966 (Gambell 1979; Best 1993). The protected status of North Atlantic blue whales was not recognized by Iceland until 1960 (Sigurjónsson 1988).

Blue whales are protected under both the Endangered Species Act (ESA) (as an endangered species) and the Marine Mammal Protection Act (MMPA). The IUCN Red List of Threatened Animals (Baillie and Groombridge 1996) lists three geographical populations of blue whales, as follows: Antarctic stock as "endangered," North Pacific stock as "low risk, conservation dependent," and North Atlantic stock as "vulnerable." The pygmy blue whale is classified as "data deficient" meaning that, although it may be threatened, too little is known to decide how it should be listed.

Only a few illegal kills of blue whales have been documented in the Northern Hemisphere, including three at Canadian east-coast whaling stations during 1966-69 (Mitchell 1974), some at shore stations in Spain during the late 1950s to early 1970s (Aguilar and Lens 1981; Sanpera and Aguilar 1992), and at least two by "pirate" whalers in the eastern North Atlantic in 1978 (Best 1992). Some illegal whaling by the USSR also occurred in the North Pacific (Yablokov 1994); it is likely that blue whales were among the species taken by these operations, but the extent of the catches is not known.

II. NORTH ATLANTIC POPULATION

A. Natural History

1. Stocks. Gambell (1979) identified ten putative stocks of blue whales in the world's oceans, including two (western and eastern) in the North Atlantic. This distinction has been adopted by others (e.g., Best 1993); however, no rigorous discussion of blue whale stock boundaries has occurred in the International Whaling Commission (IWC) (Donovan 1991), and hypotheses regarding stock structure in this species have yet to be tested with molecular or other pertinent analyses.

Murray and Hjort (1912: 714) cited the finding of American-made bomb lances in two blue whales killed in the Barents Sea as evidence that these animals had "migrated" between there and the coast of North America. However, this conclusion did not take into account the fact that an American whaler had shot experimental bomb lances into "hundreds" of blue whales off Iceland during the 1860s (see Schmitt *et al.* 1980: 101-113). One of three blue whales photo-identified off West Greenland in July-August 1988 had been photographed in the Gulf of St. Lawrence in August 1984 and August 1985 (Anon. 1990). This suggests that blue whales in Davis Strait and the Gulf of St. Lawrence belong to the same population. On the basis of catch timing and trends, Jonsgård (1955) argued that the blue whales hunted along the coasts of Newfoundland and Labrador belonged to the same stock as those hunted in Davis Strait as far north as Disko Island. Blue whales photo-identified on the Scotian Shelf and in the Gulf of Maine were also photo-identified in the St. Lawrence (Wenzel *et al.* 1988; Sears *et al.* 1990).

Sigurjónsson and Gunnlaugsson (1990a; following Jonsgård 1955; Christensen 1955) inferred from catch data and trends in sightings off Iceland that blue whales occur in "relatively discrete feeding populations." This concept of "feeding substocks" is generally accepted as applying to humpback whales in the North Atlantic (Katona and Beard 1990) and may be appropriate for blue whales as well, as originally suggested by Jonsgård (1955).

Previous assumptions about stock identity of blue whales were recently called into question by acoustic evidence from the North Atlantic. Acoustic tracking of individual blue whales has led to speculation that they may range over the entire ocean basin (Clark 1994). This could mean that the blue whales of the North Atlantic comprise a single panmictic stock (a concept anticipated by Thompson 1928). However, genetic analyses are required to elucidate this issue.

2. Distribution and Habitat Use. The overall range of blue whales in the North Atlantic extends from the subtropics north to Baffin Bay and the Greenland Sea (Jongsård 1955; Yochem and Leatherwood 1985). The species was regularly hunted from land stations in Newfoundland and Labrador, the Gulf of St. Lawrence, West Greenland, Iceland, Norway, Ireland, and the islands of Shetland, the Hebrides and the Faroes (True 1904; Thompson 1928; Sergeant 1953, 1966; Jonsgård 1955, 1977; Kapel 1979; Sigurjónsson and Gunnlaugsson 1990a).

Blue whales are rare in the shelf waters of the eastern United States. Occasional sightings of individuals have been made off Cape Cod, Massachusetts, in summer and fall (Wenzel *et al.* 1988). Farther north in Canadian waters, a few sightings have been made on the Scotian Shelf (CETAP 1982, Sutcliffe and Brodie 1977), and two blue whales were sighted in August 1995 in the lower Bay of Fundy (newspaper reports). A stranding at Ocean City, Maryland, in October 1891 (True 1904) is the southernmost confirmed record on the east coast. Several records (pre-1970) of blue whale strandings in the Gulf of Mexico (J. G. Mead, pers. comm., 27 October 1997) suggest occasional straying into that area. A large blue whale was killed at Cristobal, Panama, in the Caribbean Sea entrance to the Panama Canal in January 1922 (Harmer 1923).

In the 1960s, whalers regularly observed blue whales on the Scotian Shelf from May to November, with most sightings between July and October (Sutcliffe and Brodie 1977). Off the northern Newfoundland and southern Labrador coasts, including the Strait of Belle Isle, catches were made mainly in June and July (Jonsgård 1955; Sergeant 1953, 1966).

Blue whales are present in the Gulf of St. Lawrence for most of the year (records are for March to February according to R. Sears, pers. comm., October 1997), but most leave by early winter to avoid ice entrapment and do not return until the ice breaks up in spring. Two peaks or pulses of sightings occur in most years along the north shore of the Gulf: one in April to early June, the other from August into at least late October (R. Sears, pers. comm., August 1995). Blue whales are especially common along the north shore during the summer and fall feeding season, with a peak in sightings from June to November (Sears *et al.* 1987; R. Sears, pers. comm., October 1997) Whaling records suggest that the occurrence of blue whales is seasonal in most areas, but the lack of whaling effort during the period from late fall to spring may explain the lack of records in those seasons (e.g., see Thompson 1928).

In the Gulf of St. Lawrence, individual blue whales rarely spend more than about ten days in a particular area, and they have been described as "very nomadic, with generally low local resident times" (Sears *et al.* 1990). Four individuals were documented to have traveled more than 400 km in a two-week period during the summer and fall (Sears *et al.* 1990). However, some individuals have been documented as remaining in the same area for a month or more (R. Sears, pers. comm., August 1995). The main sighting areas are off the Gaspé Peninsula, along the Quebec north shore of the Gulf, around Anticosti Island, and in the St. Lawrence River estuary to as far upriver as Tadoussac (R. Sears, pers. comm., October 1997).

The paucity of sightings during recent surveys along the coasts of Finnmark and on the banks west of Bear Island and Svalbard, where blue whales were common in the late 1800s and early 1900s, has been interpreted to mean that the historic distribution and migratory pattern of the species in the eastern North Atlantic may have changed (Christensen *et al.* 1992a). However, it could also indicate depletion of the population by whaling.

3. <u>Feeding and Prey Selection</u>. Based on stomach content analysis, the food of blue whales in the North Atlantic has been reported to consist entirely of “krill,” i.e., relatively large euphausiid

crustaceans (Jonsgård 1955; Sergeant 1966; Christensen *et al.* 1992b). The species *Thysanoëssa inermis* and *Meganyctiphanes norvegica* are particularly important in the eastern North Atlantic (Hjort and Ruud 1929; Christensen *et al.* 1992b). The species *T. raschii* and *M. norvegica* are said to represent important food sources of blue whales in the Gulf of St. Lawrence, based on observations of feeding whales and sampling of the nearby water column (Sears *et al.* 1987). Some other prey species, including fish and copepods, have been mentioned in the literature (e.g., see the review by Kawamura 1980), but these are not likely to contribute significantly to the diet of blue whales. Sears *et al.* (1987) suggested that the whales' apparent preference for the 100 m contour during daylight hours along the north shore of the Gulf of St. Lawrence is explained by krill concentrations found regularly at depths of 90-120 m.

4. <u>Competition</u>. The question of whether blue whales are food-limited in the Northern Hemisphere has not been addressed. All baleen whale species that are sympatric with the blue whale eat euphausiids to some extent and are, therefore, potential competitors (Nemoto 1970). However, there is currently little or no direct evidence for interspecific competition involving blue whales anywhere (Clapham & Brownell 1996), and it seems unlikely that resource competition would be an important factor in preventing the recovery of blue whale stocks. The high mobility of blue whales should enable them to take advantage of transitory concentrations of prey over a very large area.

5. <u>Reproduction</u>. The gestation period is approximately 10-12 months, and blue whale calves are nursed for about 6-7 months. Most reproductive activity, including births and mating, takes place in the winter season. Weaning probably occurs on, or en route to, the summer feeding areas. The average calving interval is probably two to three years. The age at attainment of sexual maturity is uncertain but is thought to be 5-15 years (Mizroch *et al.* 1984; Yochem and Leatherwood 1985).

Only nine blue whales classified as "calves" were observed during 19 seasons of observations along the north shore of the Gulf of St. Lawrence (R. Sears, pers. comm., October 1997). Either blue whale populations are segregated in such a way that lactating females reside mainly in areas other than those in which observations have been made, or weaning occurs prior to their arrival in these areas, or (as suggested by R. Sears, pers. comm., October 1997) relatively few calves are being produced by this population.

6. <u>Natural Mortality</u>. Little is known about natural mortality of blue whales in the North Atlantic. Ice entrapment is known to injure and kill some blue whales, particularly along the southwest coast of Newfoundland during late winter and early spring (Beamish 1979; Sergeant 1982). Scarring on the dorsal surface of some whales in the St. Lawrence is thought to be from contact with ice (Sears *et al.* 1987, 1990). Two blue whales in the Gulf of St. Lawrence bore rake-like markings assumed to be from the teeth of killer whales (*Orcinus orca*) (Sears *et al.* 1990), but no direct evidence of predation on blue whales has been reported from this area.

7. <u>Abundance and Trends</u>. No good estimates of pre-exploitation population size are available. Sergeant (1966) guessed that approximately 1,500 blue whales were present in eastern Canadian waters when modern whaling began there in 1898, based on cumulative catches between 1898 and

1915. Allen (1970) used a less direct approach to infer an eastern Canadian population in 1903 of somewhat more than 1,100. All authors have agreed that the western North Atlantic stock of blue whales was severely depleted by the time that legal protection was introduced in 1955. This is also true of the stock(s) in the eastern and central North Atlantic (Jonsgård 1955). Klinowska (1991), citing FAO (1978) and Yochem and Leatherwood (1985), suggested that about 15,000 blue whales inhabited the North Atlantic when whaling began. This estimate may be too high. Regardless, it should be treated skeptically in the absence of a detailed explanation of how it was derived.

Mitchell (1974) judged from "cumulative sightings recorded by whale catchers" (see Sutcliffe and Brodie 1977) and his own surveys that the population of blue whales in the western North Atlantic during the late 1960s and early 1970s was in the "very low hundreds, at most."

More than 320 individual blue whales had been photo-identified in the Gulf of St. Lawrence from 1979 to the summer of 1995 (Sears *et al.* 1990; R. Sears, pers. comm., August 1995). The total number of photo-identified individuals for eastern Canada and New England was 352 through autumn 1997 (R. Sears, pers. comm., October 1997). Exploratory analysis of the photo-identification data from this region determined that they could not be used for a mark-recapture (i.e., sight-resight) population estimate (Hammond *et al.* 1990).

Sighting data from whaling vessels operating off the west and southwest coasts of Iceland have been interpreted as demonstrating a trend of increase, at about five percent per year, in the number of blue whales since the late 1960s (Sigurjónsson and Gunnlaugsson 1990a). This increasing trend is considered to apply specifically to the whale population in these waters, and not necessarily to the North Atlantic as a whole. An estimate of 442 blue whales in Icelandic waters (no CV calculated) was presented by Gunnlaugsson and Sigurjónsson (1990), based on the results of a shipboard survey in June-July 1987. These authors referred to the estimate as "a probable upper bound for the abundance of this species in the survey area" (p. 577). Elsewhere, however, the same authors, citing Gunnlaugsson and Sigurjónsson (1990), indicated that the blue whale population in Icelandic and neighboring waters "may number at least in the high hundreds" (Sigurjónsson and Gunnlaugsson 1990a: 548). Christensen *et al.* (1992a) suggested that surveys in 1989, once fully analyzed, would produce an estimate greater than 1,000 for Icelandic waters (see Sigurjónsson and Gunnlaugsson 1990b). There is no current estimate for the number of blue whales in eastern North Atlantic waters. As of autumn 1997, 32 individuals had been photo-identified in Icelandic waters (R. Sears, pers. comm., October 1997).

B. Human Impacts

1. Vessel interactions.

a. Collisions with ships

Blue whales are at least occasionally injured or killed by ship collisions. A juvenile male blue whale was reportedly struck and killed by a commercial vessel in March 1998 and was carried on the

bow of the ship into Narragansett, Rhode Island. The necropsy indicated that death occurred as a result of a ship strike, including bone fractures at several locations along one side of its body.

Most of one fluke of an individual in the western North Atlantic catalog was missing, apparently having been amputated by a ship's propeller (Sears *et al*. 1987, 1990). Deep gashes in the caudal peduncle are also assumed to have been made by the propellers of large ships. At least 9 percent of the whales in the Gulf of St. Lawrence have injuries or scars attributed to contact with ships (Sears *et al.* 1990); another estimate has been provided of 25% (n=355) of the blue whales in the Gulf of St. Lawrence bearing vessel contact scars (R. Sears, pers. comm., October 1997). The St. Lawrence Seaway has heavy ship traffic during the time of year when blue whales are relatively abundant there.

b. Disturbance by vessels

Since the early 1980s, blue whales have been among the main attractions for whalewatching along the north shore of the Gulf of St. Lawrence and in the St. Lawrence estuary. Although no direct evidence is available to demonstrate that persistent close approaches by tour boats have a negative effect on the whales, there is concern about such a possibility. The Canadian Government has a "code of ethics" for whalewatching; also, according to the Marine Mammal Regulations under the Canadian Fisheries Act, it is illegal to "disturb" whales (Fisheries and Oceans 1995). There is no whalewatching that targets blue whales along the eastern seaboard of the United States. Blue whales have been observed occasionally, however, during whalewatching cruises in the Gulf of Maine (Wenzel *et al.* 1988).

2. <u>Entrapment and Entanglement in Fishing Gear</u>. At least one blue whale found dead in the Gulf of St. Lawrence in recent years apparently died from the effects of entanglement in fishing gear (R. Sears, pers. comm., August 1995). A blue whale was observed on Stellwagen Bank, north of Cape Cod, Massachusetts in August 1987 trailing fishing gear, including what appeared to be a lobster pot buoy, from one pectoral fin (D.K. Mattila, pers. comm., February 1998).

The lack of more evidence that blue whales become entrapped or entangled in fishing gear in the western North Atlantic may be due to incomplete reporting. In addition, the large size of the animals makes it more likely that blue whales will break through nets, or carry gear away with them. In the latter case, undetected mortality may result from starvation due to interference with feeding, as sometimes occurs in humpback and northern right whales.

3. <u>Habitat Degradation</u>. At least some of the areas used by North Atlantic blue whales (e.g., the St. Lawrence River and Gulf) have been degraded by acoustic and chemical pollution. However, no specific evidence is available to describe or quantify the impacts of this degradation on the blue whale population. R. Sears (pers. comm., October 1997) reported having evidence that blue whales from the St. Lawrence River estuary carry substantial body burdens of chemical contaminants, including PCB's and pesticides such as DDT. However, the data have not been published.

4. Military Operations. There is currently no evidence to indicate that military activities in the North Atlantic have had an impact on blue whales. However, concern about the potential for injury or disturbance to blue whales (and other cetaceans) influenced the siting and timing of Canadian ship-shock trials on the Scotian Shelf in November 1994 (see Reeves and Brown 1994). A monitoring program was undertaken by the Canadian Department of Defense to ensure that whales were clear of the area during the blasting, and no direct effects on blue whales were documented (R. Sears, pers. comm., August 1995).

5. Hunting. Deliberate killing has had a severe effect on the status of blue whales in the North Atlantic (Jonsgård 1955). At least 11,000 were taken (all whaling areas, combined) from the late 19th to mid 20th centuries (Sigurjónsson and Gunnlaugsson 1990a).

Blue whales are not known to have been subjected to hunting anywhere in the western North Atlantic since the 1960s. Whalers who hunt humpback whales in the Lesser Antilles under the aboriginal exemption in the IWC Schedule (and other cetaceans, including sperm whales, *Physeter macrocephalus*, and pilot whales, *Globicephala macrorhynchus*) apparently do not see or attempt to take blue whales (cf. Price 1985). Similarly, the "aboriginal subsistence" whaling off the coasts of Greenland legally involves only fin and minke whales (*B. physalus* and *B. acutorostrata*, respectively) at present, and only humpback whales have been reported as having been taken illegally in recent years (e.g., see Anon. 1993). Blue whales were not reported as taken from Icelandic shore stations after 1960, but at least three "fin" whales landed in Iceland during the 1980s were fin-blue whale hybrids (Spilliaert *et al.* 1991; Árnason *et al.* 1991). Another fin-blue whale hybrid was killed by a Spanish whaling operation in 1984 (Bérubé and Aguilar 1998). Currently, Norwegian whaling operations target only minke whales, and the commercial whaling stations in Iceland, Spain, and the Portugese islands of the Azores and Madeira remain officially closed.

III. NORTH PACIFIC POPULATION

A. Natural History

1. Stocks. Little information has been available for evaluating stock differences of blue whales in the North Pacific. Although Gambell (1979) suggested that there were three stocks in the North Pacific - west, central, and east, the IWC has considered there to be a single panmictic stock in this ocean basin (Donovan 1991; also see Best 1993). A blue whale tagged in the Okhotsk Sea under the "Discovery" tagging program was reported as having been killed in waters east of Kodiak Island (Ivashin and Rovnin 1967). If this record is reliable, it indicates that considerable trans-oceanic movement occurs at least occasionally, and that North Pacific subpopulations may not be entirely discrete.

Rice (1974) hypothesized that blue whales from Baja California, Mexico, migrated far offshore to feed near the eastern Aleutians or in the Gulf of Alaska and returned to feed in California waters. However, he recently concluded, based on the presence of rare epizoites on blue whales

which were not found on other species known to migrate north, that the California population is separate from that in the Gulf of Alaska and eastern Aleutians (Rice 1992). This latter view is supported by the recent work of Calambokidis *et al.* (1995) and by length frequency analysis (Gilpatrick *et al.* 1996). The agreement between estimates of abundance calculated from line-transect surveys off California (Barlow 1995) and from sight-resight (photo-identification) data from California (Calambokidis and Steiger 1995) provides further support to the hypothesis that the blue whales off Mexico and California belong to a different stock from those in Alaskan waters. If whales observed off California in summer were merely migrating to Alaska, the sight-resight estimates are likely much higher than those derived from line-transect surveys.

Whaling catch data indicate that animals believed to belong to the central stock (as defined by Gambell 1979) feed off the Aleutian Islands in summer. The prime period for blue whale catches (made in various years between 1912 and 1939) was June through August (Reeves *et al*. 1985). "Discovery" tag returns indicate that this population ranges further to the east, with movements from the Gulf of Alaska to the Aleutian Islands, and from off Vancouver Island to the Gulf of Alaska (Omura and Ohsumi 1964; Ohsumi and Masaki 1975; Ivashin and Rovnin 1967). Migratory destinations of whales in this region are largely unknown, although it is possible that sightings of blue whales in offshore waters north of the Hawaiian Islands reflect the winter range of this stock (Berzin and Rovnin 1966). Blue whale calls detected by seafloor-mounted hydrophone arrays approximately 500 km offshore from Astoria, Oregon, in August 1990 (McDonald *et al.* 1995) and blue whales sighted off the southern Oregon coast in 1996 (J. Barlow, unpublished data) are of unknown stock origin.

In the western North Pacific, blue whales have been found offshore from Kamchatka and the Kuril Islands (Russia) in summer to Japanese waters in winter (Nishiwaki 1966; Ohsumi and Wada 1972; Fujise *et al.* 1995, 1996). Forney and Brownell (1997) analyzed locations of catches and length frequency data for blue whales taken in the North Pacific by both shore stations and pelagic operations from 1929-1965. They concluded that the western stock is separate from the population that was exploited in the Aleutian Islands area (the central stock). Furthermore, the virtual disappearance of blue whales from the area off southern Japan where they were heavily exploited (Kasaharu 1950) suggests that this area may have hosted another population that was largely separate from that found off northern Japan and Kamchatka.

Another major area of concentration for blue whales is in the eastern tropical Pacific Ocean around the Costa Rican Dome, where sightings have been recorded throughout the year. It is not clear whether this represents a single year round population or alternating seasonal use of the region by two (or more) populations (Reilly and Thayer 1990).

In conclusion, whaling and sighting data suggest the existence of at least five subpopulations of blue whales in the North Pacific, with an unknown degree of mixing among them: (i) southern Japan (which appears to have been virtually extirpated by whaling); (ii) northern Japan/Kurils/Kamchatka; (iii) Aleutian Islands (the central stock, which may winter in deep water north of Hawaii); (iv) eastern Gulf of Alaska; and (v) California/Mexico. The relationship between

any of these sub-populations and the whales that occur around the Costa Rican Dome is unclear.

2. Distribution and Habitat Use. The range of the blue whale is known to encompass much of the North Pacific Ocean, from Kamchatka to southern Japan in the west, and from the Gulf of Alaska and California south to at least Costa Rica in the east. The species is found primarily south of the Aleutian Islands and the Bering Sea (Nishiwaki 1966; Reeves *et al.* 1985). Small numbers have been observed as far north as the Chukchi Sea (Yochem and Leatherwood 1985; Rice 1986), but the reliability of these reports have been questioned (D. W. Rice, pers. comm., September 1997). The only (presumably) reliable sighting report of this species in the vicinity of the Hawaiian Islands is that of Berzin and Rovnin (1966), who noted that blue whales were observed from scientific research vessels about 400 km northeast of Hawaii in January 1964. Recordings of blue whale calls off Oahu and Midway (Northrop *et al.* 1971; Thompson and Friedl 1982) provide additional evidence that they occur within several hundred km of these islands (see Barlow *et al.* 1997).

Overall, it is clear that this species inhabits and feeds in both coastal and pelagic environments. Blue whales are frequently found on the continental shelf (e.g., in areas off the California coast, Calambokidis *et al.* 1990; Fiedler *et al.* 1998) and also far offshore in deep water (e.g., in the northeastern tropical Pacific, Wade and Friedrichsen 1979).

Knowledge concerning distribution and movement varies with area. The species appears to undertake seasonal movements in many places. Summer feeding concentrations were exploited by pelagic whalers in three areas (Rice 1974): (i) the eastern Gulf of Alaska between 130°W and 140°W, (ii) south of the eastern Aleutians between 160°W and 180°W, and (iii) from the far western Aleutians to Kamchatka, between 170°E and 160°E. It is noteworthy that, while the second of these three areas was documented to have relatively large concentrations of blue whales in the 1970s (Berzin and Vladimirov 1981), the species appears rare there today, suggesting that illegal and unreported whaling depleted the population (Stewart *et al.* 1987; Forney and Brownell 1997). Blue whales were also taken in May-October from shore stations on the eastern Aleutians and Kodiak Island through the 1930s (Reeves *et al.* 1985; Brueggeman *et al.* 1985).

In the western North Pacific, blue whale catches from shore stations were made off the southern portion of the main Japanese islands in winter, off Hokkaido in spring and early summer, and in summer off Kamchatka, the Kurils and the western Aleutians (Kasaharu 1950). This pattern could be interpreted as evidence of a seasonal progression northward, but the lack of blue whales off southern Japan today suggests that the animals of this region constituted a separate stock that has been extirpated. Japanese pelagic operations in the North Pacific took blue whales between 1952 and 1965, with the largest catches along the south side of the Aleutians (Ohsumi and Wada 1972).

Blue whales were taken off the west coast of Baja California as early as the mid-19th century (Scammon 1874). Extensive catches were made by factory ships operating in 1913/1914, from 1924 to 1930, and in 1935 (Rice 1974; Tønnessen and Johnsen 1982). The timing varied, but whalers found few whales from December through February. A similar pattern has been observed in recent years (Sears 1990; Calambokidis *et al.* 1990; Calambokidis 1995). Ingebrigtsen (1929) reported that blue

whales appeared off the Baja California coast "from the north" in October and traveled southward along the shore, returning north in April, May, and June. It is possible that the migratory destination of these whales was the Costa Rican Dome, which shows a seasonal increase in sightings in winter (Reilly and Thayer 1990).

Recently, some blue whales have been seen along the west coast of Baja California between March and July (Gendron and Zavala-Hernàndez 1995). They are first observed in Monterey Bay, around the Channel Islands, and in the Gulf of the Farallons in June and July (Calambokidis *et al.* 1990; Calambokidis 1995). They are fairly widespread and unpredictable in their areas of concentration from August to November. Individuals have been shown to move among the Gulf of the Farallons, Monterey Bay, and Point Arena, California, within years. Also, some of the whales that spend the summer and fall (August-October) off the California coast migrate to Mexican waters, where they have been re-identified by photographs in spring (March-April) (Calambokidis *et al.* 1990).

As noted below, there is evidence for blue whale distributional shifts related to prey abundance and oceanographic conditions. The appearance of numerous blue whales off the Farallon Islands is noteworthy in light of their rarity in that region prior to the late 1970s (Calambokidis *et al.* 1990). Similarly, shore-based whaling data from Moss Landing and Trinidad, California, for the period 1919-26 indicate that the species was (unlike today) extremely uncommon in this region (Clapham *et al*. 1997). Calambokidis (1995) concluded that such changes in distribution reflect a shift in feeding from the more offshore euphausiid, *Euphausia pacifica*, to the primarily neritic euphausiid, *Thysanoëssa spinifera*.

3. <u>Feeding and Prey Selection</u>. Blue whales off California and elsewhere in the North Pacific are said to prey mainly on *Euphausia pacifica*, and secondarily on the somewhat larger species *Thysanoëssa spinifera* (Rice 1986). However, recent studies in the coastal waters of California have found blue whales feeding primarily on the latter (Schoenherr 1991, Kieckhefer *et al.* 1995, Fiedler *et al.* 1998).

The species *Thysanoëssa inermis*, *Thysanoëssa longipes*, *Thysanoëssa raschii*, and *Nematoscelis megalops* have also been listed as prey of blue whales in the North Pacific (Kawamura 1980; Yochem and Leatherwood 1985). Although some stomachs of blue whales have been found to contain a mixture of euphausiids and copepods or amphipods (Nemoto 1957; Nemoto and Kawamura 1977), it is likely that the copepods and amphipods were consumed adventitiously or incidentally. One exception to their near-total dependence on euphausiid prey is that blue whales have been observed feeding on pelagic red crabs, *Pleuroncodes planipes*, off Baja California (Rice 1974, 1986), although these observations have not been confirmed by subsequent observations or other analyses (e.g., fecal analysis). Reports that they feed on small schooling fish and squid in the western Pacific (Mizue 1951; Sleptsov 1955) have been interpreted as suggesting that the preferred zooplankton are less available there (Nemoto 1957). Between February and April, blue whales in the Gulf of California, Mexico, have been observed feeding on euphausiid surface swarms (Sears 1990) consisting mainly of *Nyctiphanes simplex* engaged in reproductive activities (Gendron 1990, 1992).

Sears (1990) regarded *Nyctiphanes simplex* as the principal prey of blue whales in the region, and results from recent fecal analyses confirmed this assertion (Gendron and Del Angel-Rodriguez 1997). However, this phenomenon appears to be strongly influenced by the occurrence of El Niño Southern Oscillation (ENSO) events (Gendron and Sears 1993).

4. Competition. As in the North Atlantic, the trophic interactions of blue whales with other krill consumers are not well understood. The comments in Section II.A.4 apply here as well.

5. Reproduction. No differences in the reproductive biology of blue whales in the North Pacific and North Atlantic are known or suspected. Thus, the general comments in Section II.A.5 apply here as well.

Blue whales accompanied by young calves have been observed often in the Gulf of California from December through March, and thus at least some calves may be born in or near the Gulf (Sears 1990). Therefore, this area is probably an important nursing and calving area for the species. One female that was seen with a calf in March 1988 was resighted in March 1990 with another (Sears 1990), supporting the general belief that females of this species give birth in alternate years (Lockyer 1984).

Observations of females with calves off California occur primarily in June and July. Photogrammetric observations of small whales in late summer support the idea that weaning occurs at approximately six months of age (J. Gilpatrick, pers. comm., May 1997).

6. Natural Mortality. A well-documented observation of killer whales attacking a blue whale off Baja California proves that blue whales are at least occasionally vulnerable to these predators (Tarpy 1979). A high proportion of the blue whales in the Gulf of California bear injuries or rake-like scars that are the result of encounters with killer whales (Sears 1990), although the extent to which such attacks are fatal is unknown. Unlike in the western North Atlantic, injury or suffocation from ice entrapment is not known to be a factor in the natural mortality of blue whales in the North Pacific.

7. Abundance and Trends. With the exception of the population that summers off California, there are no reliable estimates of abundance for blue whales in the North Pacific.

A reported total of 9,500 blue whales were killed by commercial whalers in the North Pacific between 1910 and 1965 (Ohsumi and Wada 1972). This includes at least 1,378 taken by factory ships off California and Baja California between 1913 and 1937 (Rice 1992), and 48 taken by land-based whalers off central California between 1958 and 1965 (Rice 1974).

From a crude analysis of catch statistics and whaling effort, Rice (1974) concluded that the population of blue whales in the eastern North Pacific (Baja California to Alaska) was large enough to sustain an average kill of 289 per year from 1924/25 to 1928/29. Assuming an annual net recruitment rate of about 0.05, he reasoned that the initial (1924) population size would have had to be about 6,000 whales; this contrasts with the "initial stock size" of 4,900 for the entire North Pacific

estimated by Omura and Ohsumi (1974). Rice (1974) guessed that the total population of blue whales in the eastern North Pacific in the early 1970s was 2,000 or less. However, Rice's calculations assumed the existence of a single blue whale population in the eastern North Pacific, an assumption which recent findings strongly suggest is not correct.

Although they have been cited as abundance estimates (e.g., by Wade and Gerrodette 1993), the figures for blue whales in the North Pacific published by Omura and Ohsumi (1974) and by Wada (1975) were actually indices of abundance based on sightings from Japanese whaling catcher boats. The data were not collected or analyzed in the same ways as those from more recent sighting cruises, nor did the area of coverage include several well-known centers of blue whale abundance in the North Pacific (cf. Wada 1975, Figures 1-2, compared with Reilly and Thayer 1990, Figures 1, 3). It is therefore not possible to evaluate trends by comparing the Japanese "indices" from the 1960s and 1970s with the more recent abundance estimates from sighting cruises and photo-identification studies. Similarly, a widely cited figure of 1,600 blue whales (e.g., Gambell 1979) was based on data derived from a combination of very different methods and first presented in an unreviewed, unpublished manuscript (by Ohsumi and Wada). This estimate must be considered unreliable.

Russian scientists inferred from sightings made during whaling and research cruises in the 1970s that blue whale numbers were increasing throughout the North Pacific, with a particular concentration in the offshore area between 37°N-45°N and 177°E-150°W (Berzin and Vladimirov 1981). Berzin and Vladimirov (1981) estimated a pre-exploitation population size of 5,000 and a present size of 1,400-1,900, but they gave no details of how these figures were derived. An aerial survey of the former Akutan whaling grounds around the eastern Aleutians in 1984 produced no sightings of blue whales, suggesting that the population remained severely depleted (Stewart *et al.* 1987). In the early 1980s blue whales in the North Pacific were thought to be at about one-third of the historical carrying capacity stock size (1,600 out of 4,900; Mizroch *et al.* 1984), but in view of the many uncertainties, this estimate must likewise be considered questionable. Also, no blue whales were sighted during a marine mammal survey south of the Aleutian Islands in 1994 (Forney and Brownell 1997).

More than 700 individual blue whales had been photo-identified in Californian and Mexican coastal waters through 1993 (Calambokidis 1995). Ship surveys of the eastern tropical Pacific during 1986-1990 resulted in an estimate of 1,415 (95% CI 1,078-2,501) blue whales in that area (Wade and Gerrodette 1993). A ship survey at the same time of year off the California coast in 1991 produced an estimate of 2,250 (CV=0.38) for this area (Barlow 1995). Barlow (1997) reported a revised estimate of 1,927 (CV=0.16) based on a weighted average of data from 1991, 1993, and 1996 surveys off the California coast. Another estimate is available for the Mexico/California stock from mark-recapture analyses: 2,038 (CV=0.33) based on photographs of left sides and 1,997 (CV=0.42) based on right sides (Calambokidis and Steiger 1995). The best estimate of the California/Mexico stock, calculated as the average of the line-transect and mark-recapture estimates, weighted by their variances, is 2,134 (CV=0.27). By combining this estimate with that from the eastern tropical Pacific, the total eastern North Pacific population south of Oregon can be estimated at about 3,500 whales. Given our current view of stock structure within the North Pacific, this figure almost certainly does

not include all of the whales that feed in summer off Alaska and British Columbia (and possibly also Washington and Oregon).

The abundance of blue whales along the California coast has clearly been increasing during the past two decades (Calambokidis *et al.* 1990; Barlow 1994; Calambokidis 1995). The magnitude of this increase is considered too large to be explained by population growth alone, and it is therefore assumed that a shift in distribution has occurred. The evident scarcity of blue whales in areas of former abundance (e.g., Gulf of Alaska and near the Aleutian Islands; see Calambokidis *et al.* 1990) suggests that the increasing trend does not apply to the species' entire range in the eastern North Pacific.

B. Human Impacts

1. <u>Vessel Interactions</u>.

a. Collisions with ships

Ship strikes were implicated in the deaths of at least four and possibly six blue whales off California between 1980 and 1993 (Barlow *et al.* 1995; Barlow *et al.* 1997). The average number of blue whale mortalities in California attributed to ship strikes was 0.2 per year from 1991-1995 (Barlow *et al.* 1997). Further mortalities of this nature probably have occurred without being reported. Several of the whales photo-identified off California had large gashes on the dorsal body surface that were thought to have been caused by collisions with vessels (Calambokidis 1995).

b. Disturbance from vessels

In most years since the mid 1980s, blue whales have been commonly found during summer and early fall in nearshore waters along the coast of southern California, especially around the Channel Islands. Thus, some whalewatching focused on blue whales has developed in recent years, notably in the Santa Barbara Channel where the species has occurred with regularity in July and August. Sporadic whalewatching on blue whales occurs in winter off Baja California. Whalewatching has no known impact on this species. Major shipping lanes pass through, or near, whalewatching areas, and underwater noise produced by commercial ship traffic may have a much greater impact than that produced by whalewatching. However, little is known about whether, or how, vessel noise affects blue whales.

2. <u>Entrapment and Entanglement in Fishing Gear</u>. No definite evidence of blue whales being taken in fishing gear in the North Pacific is available. Heyning and Lewis (1990) made a crude estimate that about 73 rorquals were killed annually in the offshore southern California drift gillnet fishery during the 1980s, and at least some of these could have been blue whales. Heyning and Lewis suggested that most whales killed by offshore fishing gear do not drift far enough to strand on beaches or to be detected floating in the nearshore corridor where most whalewatching occurs. Thus, the lack of documentation of blue whale entanglements should not be interpreted to mean that none

occur. The drift gillnet fisheries for swordfish and sharks off California and Baja California represent a potential threat to blue whales of the Mexico/California stock. Observer coverage in such fisheries was relatively low in the past (Barlow *et al.* 1995) but increased to 10-18 percent in 1991-1995 (Barlow *et al.* 1997). In the observed fisheries, no blue whale mortalities were documented. However, entanglement rates may be underestimated inasmuch as blue whales may break through or carry away fishing gear, perhaps suffering unrecorded subsequent mortalities.

3. Habitat Degradation. The planktivorous diet of blue whales makes them less susceptible than piscivorous baleen whales to the accumulation of organochlorine and metal contaminants in their tissue. In any event, there is no reason to suspect that levels of these substances in any baleen whales are presently high enough to cause toxic or other effects (O'Shea and Brownell 1994), although possible long-term or transgenerational impacts are unstudied.

Anthropogenic noise may affect blue whales. Short-term changes in the behavior of a blue whale, interpreted as possibly a "startle response," were observed in the southern Indian Ocean during the experimental transmission of low-frequency, high-intensity underwater sounds (Bowles *et al.* 1994). Concern has been expressed about the potential impacts on blue (and other) whales of a more extensive study involving underwater sound transmission (Acoustic Thermometry of Ocean Climate, ATOC) in the North Pacific (Schmidt 1994). Studies of the responses of several whale species to the ATOC signal at Pioneer Seamount off Half Moon Bay is being concluded. Preliminary analysis shows that whales observed during trials were distributed slightly farther from the source when it was activated compared to when it was not. No other changes in behavior or distribution were observed.

4. Military Operations. Ship shock trials were conducted by the U.S. Navy approximately 90 miles southwest of San Nicolas Island, California, in late June 1994. Associated monitoring activities detected two blue whales in the vicinity, causing a relocation of the trials to an area nine miles from the animals (J. Carretta, pers. comm., June 1997).

A study to assess the impact of loud low-frequency active sonar signals by the U.S. Navy is underway. The Navy has completed a three-phase research program as the basis for an Environmental Impact Statement (EIS) on their Low-Frequency Active (LFA) sonar system. Phase I focused on the effects of the LFA signal on foraging blue whales in California, phase II focused on the effects on migrating gray whales off California, and phase III focused on its effects on breeding humpback whales off Hawaii. The EIS planning and writing are underway, and the draft EIS is expected to be completed in late 1998 or early 1999.

In addition to the potential effects from sonar and other sounds and from ordnance drops associated with training activities, military traffic contributes to the overall problem of vessel traffic (see above).

5. Hunting. As indicated above, there is no doubt that hunting had a severe impact on blue whales in the North Pacific. Areas of former abundance, notably off Japan and the Aleutian Islands, are currently host to very few blue whales (Stewart *et al.* 1987; Miyashita *et al.* 1995), strongly

suggesting that whaling gravely depleted the populations concerned.

According to Yablokov (1994), citing Zemsky and Shazhinov (1982), "It was ... well known in the Soviet Union that blue whales continued to be killed [in the Southern Hemisphere] after they were protected by the IWC." Details of these illegal kills have been reported recently (Zemsky *et al.* 1995a, 1995b). Although Yablokov (1994) stated that Russia also made illegal catches in the North Pacific from both land stations and pelagic operations, no information on these takes has been published. If these unreported catches included large numbers of blue whales, they would almost certainly have had a significant negative impact on the recovery of the species in this region.

IV. RECOVERY ACTIONS AND IMPLEMENTATION

Given the similar management and research needs involved, the North Atlantic and North Pacific blue whale populations are treated together in this section rather than separately. Accordingly, the summary of conservation efforts and recommended actions given below is applicable to both oceanic populations, except where indicated.

No whaling (either "aboriginal subsistence" or commercial) for blue whales occurs at present. Moratoria on the deliberate killing of blue whales have been in force for several decades, and these have undoubtedly had a positive effect on the species' conservation. The threat of renewed commercial whaling was one of the primary factors in the decision to add blue whales to the list of Endangered and Threatened Wildlife. For now, and presumably for the foreseeable future, this threat is not likely to recur.

The regulation of whalewatching activities in the River and Gulf of St. Lawrence, Canada (see above), and to a much lesser extent in the northeastern United States, can be viewed as providing some benefits to blue whales. There are currently no whalewatching or vessel approach regulations in U.S. or Mexican waters except those explicitly directed at protecting North Atlantic right whales in U.S. waters. Whale watching guidelines have been issued by NMFS for other endangered species and there are general prohibitions on harassment of marine mammals.

A. Goals and Objectives

The overall long-range goal of this Recovery Plan is to promote recovery of blue whale populations to levels at which it becomes appropriate to downlist them from endangered to threatened status, and ultimately to remove them from the list of Endangered and Threatened Wildlife, under the provisions of the ESA. The Act defines an "endangered species" as "any species which is in danger of extinction throughout all or a significant portion of its range." A "threatened species" is defined as "any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range."

The primary purpose of the Plan is to identify a set of actions that will minimize or eliminate

effects from human activities that are detrimental to the recovery of blue whale populations. Immediate objectives are to identify factors that may be limiting the populations and actions necessary to allow the populations to increase.

Since blue whales move freely across international borders, it is not reasonable to confine recovery efforts to U.S. waters, and this Plan stresses the importance of a multi-national approach to blue whale protection. The Plan recognizes limits imposed by the national nature of protective legislation; however, as demonstrated by recent work on humpback whales (Palsbøll *et al.* 1997), considerably more information becomes available for management of human activities affecting whale populations when actions are taken based on biological rather than political divisions, and through international cooperation leading to research and conservation at oceanic rather than national levels.

Tasks required to achieve the objectives of this Plan are listed in the step-down outline below.

B. Stepdown Outline

Items in this outline are not in order of priority. Priorities are identified in Appendix A.

1.0. Determine Stock Structure of Blue Whale Populations Occurring in U.S. Waters and Elsewhere.

1.1 Determine stock structure of blue whales using genetic analyses.

1.2 Assess daily and seasonal movements and inter-area exchange, using telemetry.

2.0. Estimate the Size and Monitor Trends in Abundance of Blue Whale Populations.

2.1 Conduct surveys to estimate the size and monitor trends in abundance of populations.

2.2 Conduct annual independent photo-identification surveys.

2.3 Maintain existing blue whale photo-identification catalogs and sighting databases, and establish others as required.

2.4 Promote international efforts to estimate abundance and investigate stock structure of blue whales in non-U.S. waters.

3.0. Identify and Protect Habitat Essential to the Survival and Recovery of Blue Whale Populations.

3.1 Promote action to protect areas of importance in U.S. waters.

3.2 Promote action to protect known areas of importance in foreign waters.

3.3 Improve knowledge of blue whale feeding ecology.

3.4 Improve knowledge of the characteristics of important blue whale habitat, and of how blue whales use such habitat.

4.0. Reduce or Eliminate Human-caused Injury and Mortality of Blue Whales.

4.1 Identify areas where ship collisions with blue whales might occur, and areas where concentrations of blue whales coincide with significant levels of maritime traffic or pollution.

4.2 Identify and implement methods to reduce ship collisions with blue whales.

4.3 Reduce or eliminate injury and mortality caused by fisheries and fishing gear.

4.4 Conduct studies of environmental pollution that may affect blue whale populations and their habitat.

5.0. Minimize Detrimental Effects of Directed Vessel Interactions with Blue Whales.

5.1 Investigate the potential effects of whale watching on blue whales.

5.2 Implement appropriate protective measures on any such activities which may be detrimental to blue whales.

6.0. Maximize Efforts to Acquire Scientific Information from Dead, Stranded, and Entangled Blue Whales.

6.1 Improve and maintain the system for reporting dead or entangled blue whales.

6.2 Improve and maintain existing programs to collect data from dead blue whales.

7.0. Coordinate State, Federal, and International Efforts to Implement Recovery Actions for Blue Whales.

7.1 Designate an implementation coordinator to facilitate Recovery Plan implementation.

7.2 Identify, at an appropriate time, representatives of the scientific community, private, state, and federal agencies (and international agencies where applicable) to periodically review and update this Recovery Plan.

7.3 Support a continued international ban on commercial hunting and other directed lethal take of blue whales, and encourage international efforts to detect and prevent illegal whaling.

8.0. Establish Criteria for Deciding Whether to Delist or Downlist Blue Whales.

8.1 Establish criteria for delisting or downlisting blue whale populations.

C. Narrative

Data collected through any research identified in this Plan should be analyzed and reported in a timely manner. Reports should be thoroughly referenced and follow standards of organization to facilitate comparison with other reports. As much as possible, data should be presented in peer-reviewed journals and other open publications to ensure that research programs benefit from regular peer commentary.

To the maximum extent possible, ongoing and future data collection should be done such that recent data can be compared with historical data. Studies may need to be conducted to calibrate

results from newly developed techniques with those obtained by previous methods. Data analyses should examine trends over time and attempt to correlate observed changes with physical, biological, or human-induced changes in the environment.

1.0. Determine Stock Structure of Blue Whale Populations Occurring in U.S. Waters and Elsewhere.

Existing knowledge of the population structure of blue whales is insufficient, and a more comprehensive understanding is essential to developing effective strategies to promote recovery.

1.1 <u>Determine stock structure of blue whales using genetic analyses.</u>

A comprehensive program of biopsy sampling of blue whales should be implemented that focuses on current and historically important blue whale habitat in both U.S. waters and elsewhere. Ideally, this would be a collaborative multi-national effort with standardized sampling protocols. Using the resulting samples, population structure can be investigated through analyses of mitochondrial and nuclear DNA. In addition, the sexual composition of each population should be assessed through molecular determination of the sex of all sampled whales. All biopsy samples should be preserved in such a way that the accompanying blubber can be utilized for contaminant analyses (item 4.4 below). The genetics work should be complemented by a thorough review of existing data (from whaling catches and other sources) on inter-area differences in morphology and meristics of blue whales. An ancillary objective of genetic studies might be to evaluate genetic variability within populations or stocks of blue whales. A comparative approach, examining differences in genetic variability between recovering versus non-recovering groups of blue whales, could prove informative.

1.2 <u>Assess daily and seasonal movements and inter-area exchange, using telemetry.</u>

Telemetry studies (notably those using satellite-monitored radio tags) should be conducted to gather information on patterns and ranges of daily and seasonal movement of individual blue whales. These studies also have the potential to address the question of exchange between subpopulations.

2.0. Estimate the Size and Monitor Trends in Abundance of Blue Whale Populations.

Estimation of abundance, and of trends in abundance, is vital to assessing the recovery of blue whale populations, yet reliable data for such estimation exist only for the California/Mexico population (see III.A.7, above). Given the known range of the blue whale, a multinational effort is essential to achieve this goal.

2.1 <u>Conduct surveys to estimate the size and monitor trends in abundance of populations.</u>

Surveys using line-transect and photo-identification methods should be conducted to

assess abundance in present or historic blue whale habitat. In U.S. waters, this includes the entire west coast and the Aleutian Islands region. Collaborative multinational efforts with standardized sampling protocols should be developed to integrate such studies with others conducted off Mexico, Canada (both Pacific and Atlantic coasts) and areas more remote from U.S. waters. Knowledge derived from the population structure studies outlined above would be used to assist in interpretation of the results of this work. Because of the relatively long generation time of blue whales, and the time scales on which environmental factors affecting their distribution may operate, programs to monitor trends in blue whale abundance must be long-term efforts.

2.2 Conduct annual independent photo-identification surveys.

Photographic identification of individual blue and other large whales has proven to be a valuable tool for estimating abundance, determining vital rates, investigating population structure, and studying a variety of other aspects of biology and behavior. A long-term collaborative photo-identification effort in the California/Mexico region has yielded considerable information on this population. The continuation of such surveys is very important to the monitoring of this stock. In addition, international efforts to support photo-identification studies in other blue whale habitats should be encouraged. The photo-identification studies would also complement the continued maintenance of photo-identification catalogs (item 2.3, below).

2.3 Maintain existing blue whale photo-identification catalogs and sighting databases, and establish others as required.

The three existing blue whale photo-identification catalogs include blue whales identified (i) off California, Mexico and adjacent regions; (ii) in the western North Atlantic, with an emphasis on the Gulf of St. Lawrence; and (iii) in waters of Baja California including inshore and offshore areas of both coasts of the Peninsula. Continued support for these catalogs is essential to improving knowledge of the status and basic biology of this species. When other concentrations of blue whales are located during the survey work recommended above, as many animals as possible should be photo-identified and new regional catalogs established. A network should also be formed to examine inter-area movements of individually identified blue whales to increase knowledge of population structure, and to integrate the results of genetic and sex-determination analyses with photo-identification studies.

Centralization of these databases would promote efficiency in addressing questions related to occurrence and habitat use. Sighting data would complement information from photo-identification catalogs and other sources.

2.4 Promote international efforts to estimate abundance and investigate stock structure of blue whales in non-U.S. waters.

As noted above, a multinational collaborative scientific effort will be required for understanding blue whale population structure and abundance at oceanic scales. Effective conservation and recovery of the species can occur only if this broad-scale approach is taken.

3.0. Identify and Protect Habitat Essential to the Survival and Recovery of Blue Whale Populations.

Some areas are known to be important habitat for blue whales; others may be discovered during the course of the studies recommended above. Protection of these areas is essential to population recovery.

3.1 Promote action to protect areas of importance in U.S. waters.

Areas of known importance include the waters off California and, historically, the Alaska/Aleutian Island region, although as noted above, blue whales may no longer be abundant in the latter region. The U.S. east coast does not appear to be a region of importance to blue whales; only occasional sightings and strandings are reported there.

It is also important to identify and protect other habitats essential to the survival and recovery of blue whales. Identification of such habitat would be accomplished using information gained from studies conducted under item 3.4 below.

3.2 Promote action to protect known areas of importance in foreign waters

Efforts should be made to encourage the governments of Canada, Mexico, and other relevant countries to protect blue whale habitat, and to join multi-national efforts of this nature. In Canada, areas important to blue whales include the Gulf of St. Lawrence, coastal waters of Newfoundland, the Scotian Shelf in the North Atlantic, and the eastern Gulf of Alaska in the North Pacific. In Mexico, the waters of Baja California, particularly the southwestern portion of the Gulf of California where nursing, feeding, and probably calving occurs, are clearly of great importance to many eastern North Pacific blue whales, including whales that spend part of the year in U.S. waters. Other areas of known importance (past or present) include the waters of Costa Rica, Iceland, Norway, Japan, and the Russian Far East.

3.3 Improve knowledge of blue whale feeding ecology.

Studies designed to improve knowledge of blue whale prey type, dietary requirements, and energetics are needed for a better understanding of both habitat use and recovery potential. This is particularly true in light of the blue whale's nearly total dependence on euphausiids, which makes it vulnerable to environmental or other catastrophes resulting in major declines in krill abundance. An avenue of research that could be pursued is to compare features of areas where blue whales appear to be recovering (e.g., Iceland, California/Mexico)

with areas where they seem not to be (e.g., off Norway, south of the Aleutian Islands). A testable hypothesis might be that populations with slow recovery rates feed on pelagic aggregations of euphausiids, which tend to be less dense and more patchy than those in nearshore areas, on which the strongly recovering blue whale populations feed (D. Croll and B. Tershy, pers. comm., August 1997).

3.4 Improve knowledge of the characteristics of important blue whale habitat, and of how blue whales use such habitat.

Characterization of habitat used by blue whales is essential to identifying other potentially important areas, and to future assessments of the health of the environments on which blue whales depend. Such characterizations would include prey type and abundance, and associated oceanographic features. Studies to determine interannual variability in habitat characteristics, and in blue whale habitat use, are important components of such work. The end-goal should be to develop a predictive framework for identifying other potentially important blue whale habitat.

4.0. Reduce or Eliminate Human-caused Injury and Mortality of Blue Whales.

Vessel strikes and entanglement in fishing gear are known to kill and injure blue whales. The frequency and significance to the population need to be studied. Implementation of appropriate measures designed to reduce or eliminate such problems are essential to recovery.

4.1 Identify areas where ship collisions with blue whales might occur, and areas where concentrations of blue whales coincide with significant levels of maritime traffic or pollution.

Research on the frequency with which shipping-related mortalities occur in blue whales is desirable, given that mortalities from this source are known, and others have almost certainly gone unrecorded. Studies to quantify the volume and type of shipping traffic in areas known to be important to blue whales are also required. This task will be assisted by efforts to improve detection and reporting of blue whale mortalities (item 6.1 below).

4.2 Identify and implement methods to reduce ship collisions with blue whales.

The practicality and effectiveness of measures to reduce ship strike mortalities should be assessed.

4.3 Reduce or eliminate injury and mortality caused by fisheries and fishing gear.

If observations from fishery observer programs, whalewatching vessels, researchers, or other sources indicate that entanglement represents a serious threat to the recovery of blue whales, actions should be taken to reduce or eliminate deaths from this cause.

4.4 Conduct studies of environmental pollution that may affect blue whale populations and their habitat.

Baleen whales (including blue whales) generally have lower levels of contaminants than odontocetes. However, nothing is known about the effects of pollutants on blue whales, notably regarding long-term impacts, transgenerational effects, and impacts on prey resources. Studies should be conducted to improve knowledge of these topics, and to examine related issues such as metabolic pathways, and effect of sex, age, reproductive condition and geographic origin on contaminant burdens. Biopsy samples collected under item 1.1 will be usable for much of this work. Studies should also be conducted to examine the impact on blue whales or blue whale habitat of point-source and other types of pollution, including low-frequency noise.

5.0. Minimize Detrimental Effects of Directed Vessel Interactions with Blue Whales.

An active whalewatching industry targeting blue whales has already developed in California, yet the impact of such activities is unknown. Excessive directed activity (whether from commercial vessels, private boats or aircraft) could potentially disrupt vital behavior such as feeding or nursing.

5.1 Investigate the potential effects of whale watching on blue whales.

Studies should be conducted to assess the effects of directed vessel and aircraft interactions on blue whale behavior.

5.2 Implement appropriate protective measures on any such activities which may be detrimental to blue whales.

If the studies recommended in item 5.1 indicate that certain types or numbers of boat or aircraft approaches adversely affect blue whales, appropriate measures should be developed and implemented.

6.0. Maximize Efforts to Acquire Scientific Information from Dead, Stranded, and Entangled Blue Whales.

Assessments of the causes and frequency of mortality (either natural or anthropogenic) are extremely important to understanding blue whale population dynamics and the threats that may impede recovery. However, the discovery of a blue whale carcass in circumstances in which it can be examined closely is a rare event. Accordingly, efforts to detect and investigate blue whale mortalities should be made as efficient as possible. Live entanglements of blue whales are rarely observed, but better reporting might provide rescue opportunities.

6.1 Improve and maintain the system for reporting dead or entangled blue whales.

In order to optimize detection and reporting of dead blue whales (whether stranded or observed at sea), the Large Whale Recovery Program coordinator should work with representatives of local, state and federal agencies, private organizations, and regional and national stranding networks to facilitate efficient observer coverage and information exchange. In addition, prompt reporting of live entanglements might provide opportunities for disentanglement rescue teams to release whales or remove gear being towed.

6.2 <u>Improve and maintain existing programs to collect data from dead blue whales.</u>

Each blue whale carcass represents an opportunity for scientific investigation of the cause of mortality, as well as of numerous other questions relating to the biology of the species. Delays in attempts to secure or examine a carcass can result in the loss of valuable data, or even of the carcass itself. Stranding network coordinators and the implementation coordinator should work with relevant agencies, organizations, and individuals to ensure that, when a blue whale carcass is reported and secured: (i) necropsy is performed as rapidly and as thoroughly as possible by qualified individuals selected to gather information regarding cause of death; (ii) samples are taken and optimally preserved for studies of genetics, toxicology, pathology, histology, and other subjects; and (iii) funding is available to rapidly notify and transport appropriate experts to the site and to distribute tissue samples to appropriate locations for analysis or storage. In addition, the implementation coordinator should work with stranding networks and the scientific community to develop and maintain lists of tissue samples requested by various qualified individuals and agencies, and ensure that these samples are routinely collected from each carcass and stored in appropriate locations or distributed to appropriate researchers for analysis. It is recognized that extensive development of stranding networks has already taken place along much of the U.S. coastline. Existing protocols should be maintained indefinitely and improved where necessary to meet the requirements listed above.

Rapid detection of blue whale carcasses, and notification and transport of qualified personnel, are vital to ensuring that the maximum amount of information is obtained. Adequate funding is imperative.

7.0. Coordinate State, Federal, and International Efforts to Implement Recovery Actions for Blue Whales.

A coordinated approach to the tasks identified in this Plan would greatly facilitate their completion. Establishment of a team charged with coordinating state and federal efforts to implement the Plan, and with pursuing international cooperative efforts, is highly desirable. Liaison between the team and the lead agency would be the responsibility of a designated individual from the latter body.

7.1 <u>Designate an implementation coordinator to facilitate Recovery Plan implementation.</u>

Many of the tasks identified in this Plan would best be accomplished by an

implementation coordinator or coordinators with responsibility for overseeing the various aspects of the recovery plan process. Tasks include developing (with appropriate input from others) and administering research contracts, participating in interagency consultations under the ESA, and helping to develop, evaluate, and implement protection measures.

7.2 Identify, at an appropriate time, representatives of the scientific community, private, state, and federal agencies (and international agencies where applicable) to periodically review and update this Recovery Plan.

As the Plan is implemented, new information will be obtained and the priorities of the Recovery Plan will accordingly require periodic review and revision. Representatives of the relevant agencies and the scientific community should be appointed to review and revise the Plan every five years for the first 15 years of implementation, and every ten years thereafter. This schedule would, of course, be subject to change in the event of resumed whaling for blue whales or the occurrence of an environmental catastrophe causing significant blue whale mortality.

7.3 Support a continued international ban on commercial hunting and other directed lethal take of blue whales, and encourage international efforts to detect and prevent illegal whaling.

The international ban on the hunting of blue whales has been vital to recovery efforts. In light of the continued low abundance of blue whales in most areas, continuation of this ban is essential. While there is currently no known illegal whaling of blue whales, it is important that international efforts to detect any future infractions be supported.

8.0. Establish Criteria for Deciding Whether to Delist or Downlist Blue Whales.

Development of scientifically defensible criteria for eventual downlisting or delisting of any endangered species is an essential part of recovery plan implementation. However, any application of such criteria requires good information about the discreteness of populations, population sizes and trends in abundance, and the nature and magnitude of threats; thus, the criteria cannot be reasonably developed prior to the acquisition of such information.

8.1 Establish criteria for delisting or downlisting blue whale populations.

A de/downlisting criteria workshop should be convened at such time as the implementation team judges that sufficient information has been gained about blue whales to develop such criteria. The workshop should include representatives of relevant agencies as well as acknowledged experts on blue whales and individuals with expertise in scientific and statistical fields essential to the success of the workshop.

LIST OF PEOPLE PROVIDING PERSONAL COMMUNICATIONS

James V. Carretta, National Marine Fisheries Service, Southwest Fisheries Science Center, P.O. Box 271, La Jolla, CA 92038-0271

Donald A. Croll, Division of Natural Sciences, University of California, Santa Cruz, Santa Cruz, CA 95064

James W. Gilpatrick, National Marine Fisheries Service, Southwest Fisheries Science Center, P.O. Box 271, La Jolla, CA 92038-0271

David K. Mattilla, Center for Coastal Studies, P.O. Box 826, Provincetown, MA 02657

James G. Mead, National Museum of Natural History, Smithsonian Institution, 10th and Constitution Avenues, NW, Washington, D.C. 20560

Dale W. Rice, National Marine Mammal Laboratory, National Marine Fisheries Service, 7600 Sand Point Way, NE, Seattle, WA 98115

Richard Sears, Mingan Island Cetacean Study, 285 Green Street, St. Lambert, Quebec, Canada J4P IT3

Bernie R. Tershy, Division of Natural Sciences, University of California, Santa Cruz, Santa Cruz, CA 95064

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APPENDIX A

Blue Whale Recovery Plan Implementation Schedule and Cost Estimates

An implementation schedule is used to direct and monitor implementation and completion of recovery tasks. Priorities in column 3 of the following implementation schedule are assigned as follows:

Priority 1 - An action that must be taken to prevent extinction or to identify those actions necessary to prevent extinction.

Priority 2 - An action that must be taken to prevent a significant decline in population numbers or habitat quality, or to prevent other significant negative impacts short of extinction.

Priority 3 - All other actions necessary to provide for full recovery of the species.

This implementation schedule prioritizes individual tasks to emphasize their importance in the recovery effort. The priority system and the criteria for each priority is based on an established NMFS policy (55 CFR 24296). It should be noted that even the highest priority tasks within a plan are not given a Priority 1 ranking unless they are actions necessary to prevent extinction. Therefore, some plans will have no Priority 1 tasks. In general, Priority 1 tasks only apply to a species facing a high magnitude of threat. This allows NMFS to set priorities for allocation of available resources among different recovery plans.

Funding is estimated according to the number of years necessary to complete the task once implementation has begun. The provision of cost estimates is not meant to imply that appropriate levels of funding will necessarily be available for all blue whale recovery tasks. Also, identification of cost estimates does not assign responsibility for providing support to NMFS or any other agency or group. The costs associated with the various recovery tasks listed below are for those to be implemented in U.S. waters only. Costs associated with promotion of international action have not been estimated.

Exhibit E

Revised 11/01/2005

HUMPBACK WHALE (*Megaptera novaeangliae*): Eastern North Pacific Stock

STOCK DEFINITION AND GEOGRAPHIC RANGE

Although the International Whaling Commission (IWC) only considered one stock (Donovan 1991), there is now good evidence for multiple populations of humpback whales in the North Pacific (Johnson and Wolman 1984; Baker et al. 1990). Aerial, vessel, and photo-identification surveys, and genetic analyses indicate that within the U.S. EEZ, there are at least three relatively separate populations that migrate between their respective summer/fall feeding areas and winter/spring calving and mating areas (Calambokidis et al. 2001, Baker et al. 1998): 1) winter/spring populations in coastal Central America and Mexico which migrate to the coast of California to southern British Columbia in summer/fall (Steiger et al. 1991, Calambokidis et al. 1996) - referred to as the eastern North Pacific stock (Figure 1); 2) winter/spring populations of the Hawaiian Islands which migrate to northern British Columbia/Southeast Alaska and Prince William Sound west to Kodiak (Baker et al. 1990, Perry et al. 1990, Calambokidis et al. 2001) - referred to as the central North Pacific stock; and 3) winter/spring populations of Japan which, based on Discovery Tag information, probably migrate to waters west of the Kodiak Archipelago (the Bering Sea and Aleutian Islands) in summer/fall (Berzin and Rovnin 1966, Nishiwaki 1966, Darling 1991) - referred to as the western North Pacific stock. Winter/spring populations of humpback whales also occur in Mexico's offshore islands; the migratory destination of these whales is not well known (Calambokidis et al. 2001), but Norris et al. (1999) speculate that they may travel to the Bering Sea or Aleutian Islands. This stock structure represents the predominant migration patterns, but there is not a perfect correspondence between the breeding and feeding areas that are paired above. For example, some individuals migrate from Mexico to the Gulf of Alaska and others migrate from Japan to British Columbia. In general, interchange occurs (at low levels) between breeding areas, but fidelity is extremely high among the feeding areas (Calambokidis et al. 2001).

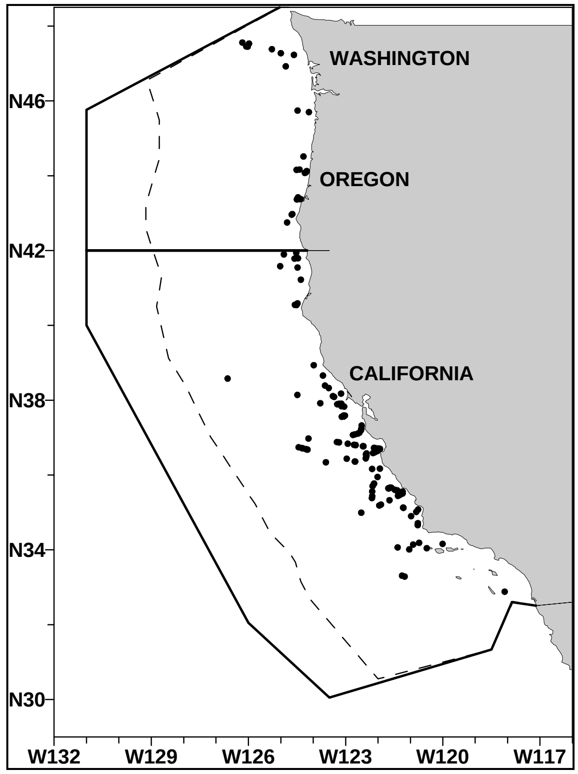

Figure 1. Humpback whale sightings based on shipboard surveys off California, Oregon, and Washington, 1991-2001. Dashed line represents the U.S. EEZ, thick line indicates the outer boundary of all surveys combined. See Appendix 2 for data sources and information on timing and location of survey effort.

Significant levels of genetic differences were found between the California and Alaska feeding groups based on analyses of mitochondrial DNA (Baker et al. 1990) and nuclear DNA (Baker et al. 1993). The genetic exchange rate between California and Alaska is estimated to be less than 1 female per generation (Baker 1992). Two breeding areas (Hawaii and coastal Mexico) showed fewer genetic differences than did the two feeding areas (Baker 1992). This is substantiated by the observed movement of individually identified whales between Hawaii and Mexico (Baker et al. 1990). There have been no individual matches between 597 humpbacks photographed in California and 617 humpbacks photographed in Alaska (Calambokidis et al. 1996). Only two of the 81 whales photographed in British Columbia have matched with a California catalog (Calambokidis et al. 1996), indicating that the U.S./Canada border is an approximate geographic boundary between feeding populations.

Until further information becomes available, three management units of humpback whales (as described above) are recognized within the U.S. EEZ of the North Pacific: the eastern North Pacific stock (this report), the central North Pacific stock, and the western North Pacific stock. The central and western North Pacific stocks are reported separately in the Stock Assessment Reports for the Alaska Region.

POPULATION SIZE

Based on whaling statistics, the pre-1905 population of humpback whales in the North Pacific was estimated to be 15,000 (Rice 1978), but this population was reduced by whaling to approximately 1,200 by 1966 (Johnson and Wolman 1984). The North Pacific total now almost certainly exceeds 6,000 humpback whales (Calambokidis et al. 1997). Estimates of the abundance of the eastern Pacific stock of humpback whales were made by aerial survey (Dohl 1983; Forney et al. 1995) and ship surveys (Barlow 1995), but those estimates are now over 9 years old and the aerial estimates did not include correction factors for diving whales that would be missed. More recent estimates are available from ship surveys and mark-recapture studies. Barlow (2003) estimated 1,314 (CV=0.30) humpbacks in California, Oregon, and Washington waters based on summer/fall ship line-transect surveys in 1996 and 2001. Calambokidis et al. (2004) estimated humpback whale abundance in these feeding areas from 1991 to 2003 using Petersen mark-recapture estimates based on photo-identification collections in adjacent pairs of years (Figure 2). These data show a general upward trend in abundance followed by a large (but not statistically significant) drop in the 1999/2000 and 2000/2001 estimates. The 2002/2003 population estimate (1,391, CV=0.22) is higher than any previous estimates and may indicate that the apparent decline in the previous two estimates exaggerates any real decline that might have occurred (Calambokidis et al. 2003) or that a real decline was followed by an influx of new whales from another area (Calambokidis et al. 2004). This latter view is substantiated by the greater fraction of new whales seen for the first time in 2003 (Calambokidis et al. 2004). In general, mark-recapture estimates are negatively biased due to heterogeneity in sighting probabilities (Hammond 1986); however, this bias is likely to be minimal because the above mark-recapture estimate is based on data from nearly half of the entire population (the 2002/2003 data contained 542 known individuals). The recent ship line transect estimate from 1996-2001 surveys is less precise than the mark-recapture estimates and is negatively biased because it does not include some humpback whales which could not be identified in the field and which were recorded as "unidentified large whale".

Minimum Population Estimate

The minimum population estimate for humpback whales in the California/Mexico stock is taken as the lower 20th percentile of the log-normal distribution of 2002/2003 abundance estimated from mark-recapture methods (Calambokidis et al. 2004) or approximately 1,158.

Current Population Trend

Ship surveys provide some indication that humpback whales increased in abundance in California coastal waters between 1979/80 and 1991 (Barlow 1994) and between 1991 and 1996 (Barlow 1997); however estimates declined between 1996 and 2001 (Barlow 2003). Mark-recapture population estimates increased steadily from 1988/90 to 1997-98 at about 8% per year (Calambokidis et al. 1999). The apparent dip in the 1999/2000 and 2000/2001 estimates may indicate that population growth is slowing, but the subsequent increases in 2001/2002 and 2002/2003 casts some doubt on this explanation. Population estimates for the entire North Pacific have also increased substantially from 1,200 in 1966 to 6,000-8,000 circa 1992. Although these estimates are based on different methods and the earlier estimate is extremely uncertain, the growth rate implied by these estimates (6-7%) is consistent with the recently observed growth rate of the eastern North Pacific stock.

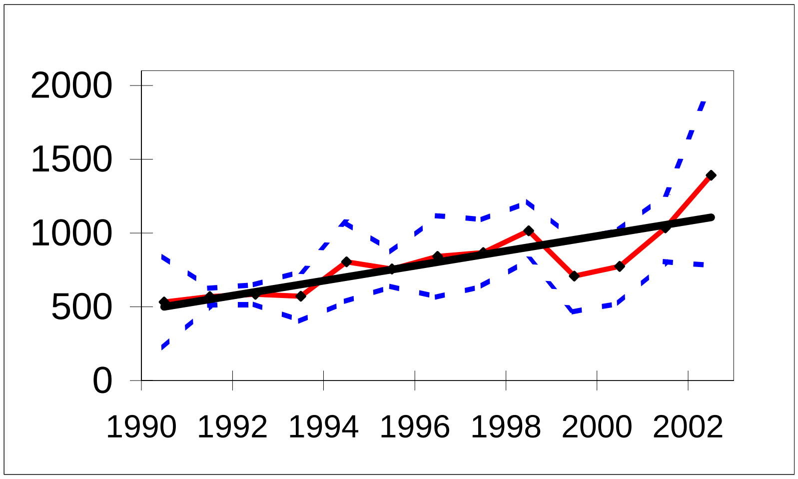

Figure 2. Mark-recapture estimates of the abundance of humpback whales feeding off California, Oregon, and Washington based on photo-identification studies (Calambokidis et al. 2004). Dotted lines indicate +/- 2 standard errors for each estimate. Straight, bold line indicates linear regression.

CURRENT AND MAXIMUM NET PRODUCTIVITY RATES

The proportion of calves in the California/Mexico stock from

1986 to 1994 appeared much lower than previously measured for humpback whales in other areas (Calambokidis and Steiger 1994), but in 1995-97 a greater proportion of calves were identified, and the 1997 reproductive rates for this population are closer to those reported for humpback whale populations in other regions (Calambokidis et al. 1998). Despite the apparently low proportion of calves, two independent lines of evidence indicate that this stock was growing in the 1980s and early 1990s (Barlow 1994; Calambokidis et al. 2003) with a best estimate of 8% growth per year (Calambokidis et al. 1999). The current net productivity rate is unknown.

POTENTIAL BIOLOGICAL REMOVAL

The potential biological removal (PBR) level for this stock is calculated as the minimum population size (1,158) <u>times</u> one half the estimated population growth rate for this stock of humpback whales (½ of 8%) <u>times</u> a recovery factor of 0.1 (for an endangered species with a total population size of less than 1,500), resulting in a PBR of 4.6. Because this stock spends approximately half its time outside the U.S. EEZ, the PBR allocation for U.S. waters is 2.3 whales per year.

HUMAN-CAUSED MORTALITY AND SERIOUS INJURY

Historic Whaling

The reported take of North Pacific humpback whales by commercial whalers totaled approximately 7,700 between 1947 and 1987 (C. Allison, IWC unpubl. data). In addition, approximately 7,300 were taken along the west coast of North America from 1919 to 1929 (Tonnessen and Johnsen 1982). Total 1910-1965 catches from the California-Washington stock includes at least the 2,000 taken in Oregon and Washington, the 3,400 taken in California, and the 2,800 taken in Baja California (Rice 1978). Shore-based whaling apparently depleted the humpback whale stock off California twice: once prior to 1925 (Clapham et al. 1997) and again between 1956 and 1965 (Rice 1974). There has been a prohibition on taking humpback whales since 1966.

Fishery Information

A 1999-2003 summary of known fishery mortality and injury for this stock of humpback whales is given in Table 1. Detailed information on these fisheries is provided in Appendix 1. After the 1997 implementation of a Take Reduction Plan, which included skipper education workshops and required the use of pingers and minimum 6-fathom extenders, overall cetacean entanglement rates in the drift gillnet fishery dropped considerably (Barlow and Cameron 2003). Mean annual takes for this fishery (Table 1) are based on 1999-2003 data. This results in an average estimate of zero humpback whales taken annually. Some gillnet mortality of large whales may go unobserved because whales swim away with a portion of the net. The deaths of two humpback whales that stranded in the Southern California Bight have been attributed to entanglement in fishing gear (Heyning and Lewis 1990), and a humpback whale was observed off Ventura, CA in 1993 with a 20 ft section of netting wrapped around and trailing behind. During the period 1999-2003, a humpback cow-calf pair was seen entangled in a net off Big Sur, California (1999) and another lone humpback was seen entangled in line and fishing buoys off Grover City (2000), but the fate of these animals is not known (J. Cordero, NMFS unpubl. data). One humpback whale was entangled and released alive in the swordfish/thresher shark drift gillnet fishery in November of 1999 at N33^{o}17' W120^{o} 49' (set DN-SD-0949). Other unobserved fisheries may also result in injuries or deaths of humpback whales. In 2001, a humpback whale with “pot gear” wrapped around its flukes was seen free-swimming 8 miles offshore of Point Bonita, California (NMFS, Southwest Region, unpublished data). In 2003, there were five separate reports of humpback whales entangled in crab pot and/or polypropylene lines (J. Cordero, NMFS, unpubl. data). In March 2003, an adult female with a calf was seen off Monterey with crab pot line wrapped around its flukes. An adult humpback was seen in May 2003 in the Santa Barbara Channel with 100 feet of yellow polypropylene line wrapped around it pectoral fins and caudal peduncle. Another adult female with a calf was seen in August 2003 west of the Farallon Islands with crab pot line with floats wrapped around its caudal peduncle and fluke lobe; the adult was reported to be ‘diving awkwardly’. In November 2003, there were two reports within four days near Crescent City and south of Humboldt Bay of single humpback whales with crab pot line wrapped around their ‘torso’. These two reports may represent the same whale. The final status of all these whales is unknown.

Drift gillnet fisheries for swordfish and sharks exist along the entire Pacific coast of Baja California, Mexico and may take animals from the same population. Quantitative data are available only for the Mexican swordfish drift gillnet fishery, which uses vessels, gear, and operational procedures similar to those in the U.S. drift gillnet fishery, although nets may be up to 4.5 km long (Holts and Sosa-Nishizaki 1998). The fleet increased from two vessels in 1986 to 31 vessels in 1993 (Holts and Sosa-Nishizaki 1998). The total number of sets in this fishery in 1992 can be estimated from data provided by these authors to be approximately 2700, with an observed rate of

marine mammal bycatch of 0.13 animals per set (10 marine mammals in 77 observed sets; Sosa-Nishizaki et al. 1993). This overall mortality rate is similar to that observed in California driftnet fisheries during 1990-95 (0.14 marine mammals per set; Julian and Beeson, 1998), but species-specific information is not available for the Mexican fisheries. Previous efforts to convert the Mexican swordfish driftnet fishery to a longline fishery have resulted in a mixed-fishery, with 20 vessels alternately using longlines or driftnets, 23 using driftnets only, 22 using longlines only, and seven with unknown gear type (Berdegué 2002).

Table 1. Summary of available information on the incidental mortality and injury of humpback whales (eastern North Pacific stock) for commercial fisheries that might take this species (Cameron and Forney 2000; Carretta 2001, 2002; Carretta and Chivers 2003, 2004). Injury includes any entanglement that does not result in immediate death and may include serious injury resulting in death. n/a indicates that data are not available. Mean annual takes are based on 1999-2003 data unless noted otherwise.

Fishery Name	Year(s)	Data Type	Percent Observer Coverage	Observed Mortality (and injury)	Estimated mortality (CV in parentheses)	Mean Annual Takes (CV in parentheses)
CA/OR thresher shark/swordfish drift gillnet fishery	1999	Observer data	20.0%	0	Mortality	Mortality
	2000		22.9%	0	0,0,0,0,0	0
	2001		20.4%	0		
	2002		20.0%	0	Injury	Injury
	2003		20.3%	0	0,0,0,0,0	0
CA angel shark/halibut and other species large mesh (>3.5”) set gillnet fishery	1990-94	Observer data	10-15%	0,0,0,0,0	0,0,0,0,0	0[1]
	1999		23.1%[2]	0[2]	0[2]	
	2000		26.9%[2]	0[2]	0[2]	
	2001		0%	0[1]	0[1]	
	2002		0%	0[1]	0[1]	
	2003		0%	0[1]	0[1]	
Unidentified fisheries	1999-2003	Stranding& sightings	n/a	0 (6)	n/a	> 1.2
Total Annual Takes						> 1.2

[1] The CA set gillnets were not observed in 1995-98, and observations in 1999-2000 only included Monterey Bay; mortality for unobserved areas and times was extrapolated from effort estimates and 1991-94 entanglement rates. The fishery was not observed in 2001-2002, owing to area closures that reduced fishing effort to negligible levels.
[2] Observer coverage and observed mortality in 1999-2000 only includes the observed portion of the fishery in Monterey Bay. Observer coverage throughout the entire fishery was only 4.0% and 1.8%, respectively.

Ship Strikes

Ship strikes were implicated in the deaths of at least two humpback whales in 1993, one in 1995, and one in 2000 (J. Cordaro, NMFS unpubl. data). During 1999-2003, there were an additional 5 injuries and 2 mortalities of unidentified large whales attributed to ship strikes. Additional mortality from ship strikes probably goes unreported because the whales do not strand or, if they do, they do not have obvious signs of trauma. Several humpback whales have been photographed in California with large gashes in their dorsal surface that appear to be from ship strikes (J. Calambokidis, pers. comm.). The average number of humpback whale deaths by ship strikes for 1999-2003 is at least 0.2 per year.

Other human-caused mortality

A humpback whale died and stranded near Moss Landing in 2000 with synthetic (possibly nylon) line wrapped around its flukes. The origin of this line (fishery or other anthropogenic source) is unknown. The average number of humpback deaths from unknown anthropogenic sources is 0.2 per year from 1999-2003.

STATUS OF STOCK

Humpback whales in the North Pacific were estimated to have been reduced to 13% of carrying capacity (K) by commercial whaling (Braham 1991). Clearly the North Pacific population was severely depleted. The initial abundance has never been estimated separately for the eastern North Pacific stock, but this stock was also depleted (probably twice) by whaling (Rice 1974; Clapham et al. 1997). Humpback whales are formally listed as "endangered" under the Endangered Species Act (ESA), and consequently the California/Mexico stock is automatically considered as a "depleted" and "strategic" stock under the MMPA. The estimated annual mortality

and injury due to entanglement (1.2/yr), other anthropogenic sources (0.2/yr), plus ship strikes (0.2/yr) in California is less than the PBR allocation of 2.3 for U.S. waters. The three humpbacks that were entangled at sea may have been seriously injured. Based on strandings and gillnet observations, annual humpback whale mortality and serious injury in California's drift gillnet fishery is probably greater than 10% of the PBR; therefore, total fishery mortality may not be approaching zero mortality and serious injury rate. The eastern North Pacific stock appears to be increasing in abundance. The increasing levels of anthropogenic noise in the world's oceans, such as those produced by ATOC (Acoustic Thermometry of Ocean Climate) or LFA (Low Frequency Active) Sonar, have been suggested to be a habitat concern for whales, particularly for baleen whales that may communicate using low-frequency sound.

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Exhibit F

Exhibit F

WORLD PORT RANKING - 2005									
TOTAL CARGO VOLUME, MILLIONS OF TONS					CONTAINER TRAFFIC (TEUs, 000s)				
RANK	PORT	COUNTRY	MEASURE	TONS	RANK	PORT	COUNTRY	TEUs	
1	Shanghai	China	MT	443.0	1	Singapore	Singapore	23,192	
2	Singapore	Singapore	FT	423.3	2	Hong Kong	China	22,427	
3	Rotterdam	Netherlands	MT	376.6	3	Shanghai	China	18,084	
4	Ningbo	China	MT	272.4	4	Shenzhen	China	16,197	
5	Tianjin	China	MT	245.1	5	Busan	South Korea	11,843	
6	Guangzhou	China	MT	241.7	6	Kaohsiung	Taiwan	9,471	
7	Hong Kong	China	MT	230.1	7	Rotterdam	Netherlands	9,287	
8	Busan	South Korea	RT	217.2	8	Hamburg	Germany	8,088	
9	South Louisiana	United States	MT	192.5	9	Dubai	United Arab Emirates	7,619	
10	Houston	United States	MT	192.0	10	Los Angeles	United States	7,485	
11	Nagoya	Japan	MT	187.1	11	Long Beach	United States	6,710	
12	Qingdao	China	MT	184.3	12	Antwerp	Belgium	6,482	
13	Kwangyang	South Korea	MT	177.5	13	Qingdao	China	6,307	
14	Dalian	China	MT	176.8	14	Port Klang	Malaysia	5,544	
15	Qinhuangdao	China	MT	167.5	15	Ningbo	China	5,208	
16	Chiba	Japan	FT	165.7	16	Tianjin	China	4,801	
17	Antwerp	Belgium	MT	160.1	17	New York/New Jersey	United States	4,785	
18	Shenzhen	China	MT	153.9	18	Guangzhou	China	4,685	
19	New York/New Jersey	United States	MT	138.0	19	Tanjung Pelepas	Indonesia	4,177	
20	Kaohsiung	Taiwan	MT	137.9	20	Laem Chabang	Thailand	3,834	
21	Yokohama	Japan	FT	133.3	21	Bremen/Bremerhaven	Germany	3,736	
22	Hamburg	Germany	MT	125.7	22	Tokyo	Japan	3,593	
23	Inchon	South Korea	MT	123.5	23	Xiamen	China	3,342	
24	Port Hedland	Australia	MT	110.6	24	Tanjung Priok	Indonesia	3,282	
25	Dampier	Australia	MT	110.1	25	Algeciras	Spain	3,180	
26	Port Kelang	Malaysia	MT	109.7	26	Gioia Tauro	China	3,161	
27	Ulsan	South Korea	RT	103.5	27	Yokohama	Japan	2,873	
28	Kitakyushu	Japan	MT	101.7	28	Jeddah	Saudi Arabia	2,836	
29	Marseilles	France	MT	96.6	29	Felixstowe	United Kingdom	2,700	
30	Osaka	Japan	FT	93.1	30	Jawaharlal Nehru	Saudi Arabia	2,667	
31	Tubarao	Brazil	MT	92.7	31	Manila	Philippines	2,665	
32	Dubai Ports	United Arab Emirates	MT	92.5	32	Dalian	China	2,665	
33	Tokyo	Japan	FT	92.0	33	Salalah	Omsn	2,492	
34	Kobe	Japan	MT	91.2	34	Nagoya	Japan	2,491	

35	Richards Bay	Australia	MT	86.6	35	Colombo	Sri Lanka	2,455
36	Itaqui	Brazil	MT	85.9	36	Valencia	Spain	2,410
37	Newcastle	Australia	MT	85.6	37	Oakland	United States	2,273
38	Hay Point	Australia	MT	81.6	38	Santos	Brazil	2,268
39	Vancouver	Canada	MT	76.5	39	Kobe	Japan	2,262
40	Huntington - Tristate	United States	MT	76.1	40	Le Havre	France	2,119
41	Le Havre	France	MT	75.0	41	Keelung	Taiwan	2,091
42	Amsterdam	Netherlands	MT	74.9	42	Seattle	United States	2,088
43	Long Beach	United States	MT	72.4	43	Barcelona	Spain	2,071
44	Santos	Brazil	MT	71.9	44	Tacoma	United States	2,066
45	Beaumont, TX	United States	MT	71.6	45	Charleston	United States	1,987
46	Novorossiysk	Russia	MT	70.8	46	Hampton Roads	United States	1,982
47	Corpus Christi	United States	MT	70.4	47	Khor Fakkan	United Arab Emirates	1,930
48	Gladstone	Australia	MT	67.2	48	Ho Chi Minh	Vietnam	1,911
49	Sepetiba	Brazil	MT	67.1	49	Savannah	United States	1,902
50	Algeciras	Spain	MT	63.5	50	Melbourne	Australia	1,863

Abbreviations: MT=Metric Ton HT= Harbor Ton. FT=Freight Ton. RT = Revenue Ton.

NOTE: ***The cargo rankings based on tonnage should be interpreted with caution since these measures are not directly comparable and cannot be converted to a single, standardized unit.***

Sources: *Shipping Statistics Yearbook 2006* ; Containerisation International Yearbook 2007;U.S. Army Corps of Engineers, *Waterborne Commerce of the United States CY 2005; AAPA Surveys* ; various port authority internet sites.

Exhibit G

Exhibit G

VTS User's Manual

USCG Vessel Traffic Service San Francisco

User's Manual - March 2005

INTRODUCTION

The primary mission of Vessel Traffic Service (VTS) San Francisco is to coordinate the safe, secure and efficient transit of vessels in San Francisco Bay. Originally established in 1973, Congress mandated participation in the VTS on 13 October 1994. In May 1995 the Coast Guard established Regulated Navigation Areas (RNAs) in areas where maneuvering room is limited.

To carry out this mission and the secondary mission of assisting Coast Guard units and other public agencies, VTS uses Automatic Identification System (AIS), radar, closed-circuit television (CCTV), and VHF-FM radiotelephone to gather and disseminate vessel traffic information. The VTS personnel who staff the Vessel Traffic Center (VTC) 24 hours a day, seven days a week receive reports from mariners and correlate those reports with the AIS, radar and CCTV information to get an accurate picture of vessel movements. Thus the accuracy of information that VTS provides depends largely on mariners' participation - VTS traffic summaries and reports of floating obstructions, can be no more accurate than the reports given to VTS and the ability of VTS equipment to verify those reports.

All mariners are encouraged to read this manual prior to participating in the San Francisco VTS. In accordance with the National VTS regulations mariners must keep a copy of this manual readily available when operating in the VTS area. VTS asks for mariners' cooperation and welcomes suggestions as to how to improve this manual or the San Francisco VTS. *Send suggestions and/or comments to:*

COMMANDING OFFICER
VESSEL TRAFFIC SERVICE SAN FRANCISCO
YERBA BUENA ISLAND
SAN FRANCISCO, CA 94130
PHONE: (415) 556-2950
OPERATIONS CENTER: (415) 556-2760
FAX: (415) 556-6851
www.uscg.mil/d11/vtssf

CONCEPT OF OPERATIONS

The primary function of VTS San Francisco is to facilitate good order and predictability on a waterway by coordinating vessel movements through the collection, verification, organization, and dissemination of information. To accomplish this, VTS San Francisco uses the concept of a "continuum of traffic management". This continuum consists of the following levels of control: Monitor, Inform, Recommend, and Direct.

(1) Monitor: Using AIS, radar, CCTV, and radiotelephone equipment, VTS monitors vessel traffic in the VTS Area. VTS also receives information from various sources on predicted vessel movements, hazards to navigation, aids to navigation discrepancies, and other information of interest to VTS users. Monitoring vessel traffic allows us to ensure that vessels are navigating safely and efficiently in accordance with applicable regulations and Navigation rules.

(2) *Inform*: VTS analyses the information gathered then informs participants as applicable. This is done at the user's request, when it appears necessary to VTS personnel, or at regular intervals. The purpose of informing participants is to give them timely information to allow them to make decisions concerning the navigation of their vessels.

(3) *Recommend*: Almost all of VTS San Francisco operations are conducted at the monitor and inform levels. However, at certain times the VTS will recommend action be taken by a participant to prevent a potentially dangerous situation. Such recommendations are offered to assist the participant in avoiding hazardous situations early on. Recommendations are made on the pretence that there is information available to VTS of which the participant may not be aware.

(4) *Direct*: On rare occasions (and during heightened security conditions) VTS will direct movement or actions of a participant. Direction would be given in cases when the VTC observes obvious violations of regulations or an obvious and immediately dangerous condition of which the participant is not or does not seem to be aware. Directions will normally be in the form of a general objective such as staying out of a certain area or coming no closer than a certain distance from a vessel or facility.

The ultimate responsibility for safe navigation of a vessel remains with the master or person in charge. Each of these actions, monitor, inform, recommend and direct are independent of each other and one action does not necessarily proceed the other. For instance, VTS may not issue a recommendation prior to issuing a direction. When performing the functions discussed here, VTS is not relieving the master or person in charge of his or her responsibility to control vessel movement. At no time is that person relieved by the VTC of responsibilities assigned by the applicable Navigation Rules and other pertinent laws or regulations.

Fishing vessels and recreational vessels, although generally not required to participate in the VTS, are encouraged to monitor the VTS radio channels, as needed, to gather traffic movement information.

VTS maintains a continuous radiotelephone watch on VHF-FM channels 12 (156.60 MHz), 13 (156.65 MHz), 14 (156.70 MHz) and 16 (156.80 MHz). The call sign is "SAN FRANCISCO TRAFFIC." Once communications are established, the abbreviated call sign "TRAFFIC" may be used. If communications on Ch. 12, Ch. 13 or Ch. 14 are lost, call TRAFFIC on Ch. 16 and be prepared to shift to another frequency. All reports should be in English and use the 24-hour clock system.

The VTS Area is separated into two sectors with a separate dedicated operating frequency for each sector. These two sectors are labeled Inshore Sector and Offshore Sector. Use channel 14 when transiting in the Inshore Sector; use channel 12 when transiting in the Offshore Sector. Participation procedures for each of these sectors are outlined in the Inshore Sector Reporting Procedures and the Offshore Sector Reporting Procedures section of this Users Manual. (The Inshore Sector begins at the boundary of the Offshore Precautionary Area.)

In addition to monitoring the VTS dedicated frequency for the sector in which the vessel is operating, vessels that are required to participate in the Vessel Traffic Service must maintain a listening watch on channel 13. A listening watch on channel 16 is not required on vessels subject to the Vessel Bridge-to-Bridge Radiotelephone Act who are also participating in a Vessel Traffic Service system when the watch is maintained on both the vessel bridge-to-bridge frequency and a designated VTS frequency (47 CFR 80.148 (b)).

SECTOR PROCEDURES

For purposes of traffic management throughout the VTS area, VTS San Francisco is divided into two Sectors - Offshore and Inshore. The boundary between the offshore and inshore sector occurs at the western side of the precautionary area.

OFFSHORE SECTOR PROCEDURES

Initial Check-in and Sailing Plan Report

The Offshore Sector area is formally defined as the ocean waters within a 38 nautical mile radius of Mount Tamalpais (37°55.8'N 122°34.6'W) excluding the San Francisco Offshore Precautionary Area. (The San Francisco Offshore Precautionary Area is the the area within a six mile radius of the San Francisco Sea Buoy.)

This translates roughly to an arc starting at the shoreline near Bodega head, crossing Cordell Bank, then circling southward to pass about 30 nautical miles west of the San Francisco Sea Buoy, and curving eastward to the shoreline near Pescadero Point. This arc is shown on charts 18640 and 18680.

The eastern boundary of the Offshore Sector is a line from Duxbury Point due south to the boundary of the San Francisco Offshore Precautionary area, then following the boundary of the Precautionary Area past the "N" "W" and "S" buoys, and then due east to Mussel Rock.

When approaching from sea, check in with VTS 15 minutes from the outer boundary on channel 12 and report your Sailing Plan.

Sailing Plan

Give the following information in your Sailing Plan.

- Vessel name
- Vessel type
- Position latitude and longitude (if unable to provide coordinates then provide your bearing and range from the SFSB)
- ETA (estimated time of arrival) at next reporting point
- ETA at the SFSB (if inbound) or the outermost reporting point on your route (if outbound or transiting across the Offshore Sector)

Sailing Plan Amplification Reports

When your vessel is at the next reporting point, Call VTS. Give the following information:

- Vessel name and position (that is, the Offshore reporting point you are passing)
- Vessel's course and speed
- Estimated time of arrival (ETA) at the San Francisco Sea Buoy (SFSB) if you are inbound
- ETA to the outermost reporting point if you are outbound

Other Reports

When conducting research, engaged in naval exercises, or conducting other special operations in the Offshore Sector, report your Sailing Plan to VTS and include the nature of your operation. Report any emergency on board your vessel or other vessels to VTS immediately.

When you are engaged in fishing you may report this fact to VTS. However, you are not required to do so unless your vessels fits into one of the categories described in 33 CFR § 161.2. defined as follows: Vessel Movement Reporting System (VMRS) User means a vessel, or an owner, operator, charterer, Master, or

person directing the movement of a vessel that is required to participate in a VMRS. Towing Vessel means any commercial vessel engaged in towing another vessel astern, alongside, or by pushing ahead.

TRANSITING ACROSS THE OFFSHORE SECTOR

When you are transiting across the Offshore Sector and will not enter the San Francisco Offshore precautionary Area, call VTS on channel 12 and report your Sailing Plan when you reach the first Offshore sector reporting point on your route. (See below list of reporting points in the Offshore Sector).

OFFSHORE VESSEL TRAFFIC ADVISORIES

VTS broadcasts the positions, courses, speeds, and estimated times of arrivals at reporting points of all VTS users who have reported to VTS in the Offshore Sector. VTS makes these advisories at minute 15 and minute 45 each hour. VTS strongly recommends that vessels in the area of the Offshore sector listen to these broadcasts.

OFFSHORE Reporting Points

North

Bodega head or Cordell Bank;
Point Reyes (or entering the Traffic Separation Scheme);
“N” Buoy or Duxbury Reef Buoy.

West

Approximately 30 nautical miles from the SFSB
or at longitude 123° 20’ W;
Southeast Farallon Island (entering the TSS)
“W” Buoy.

South

Pescadero Point
or approximately 30 nautical miles from the SFSB
or at latitude 37° 15’N;
Pillar Point (entering the TSS)
“S” Buoy or Mussel Rocks.

NOTE: The outer boundary of the Offshore Sector is approximately 30 nautical miles from the SF Sea Buoy.

INSHORE SECTOR

The Inshore Sector consists of the waters of the San Francisco Offshore Precautionary Area eastward to San Francisco Bay and its tributaries extending inland to the ports of Stockton, Sacramento, and Redwood City. Active participation by vessels that fall under the Vessel Movement Report System (33CFR161.16) is characterized by the use of three reports. The procedure for each report is as follows.

1. **Sailing Plan**. A vessel shall provide a sailing plan to the VTS on channel 14 at least 15 minutes prior to getting underway from a berth or anchorage in the Inshore Sector. The Sailing Plan should contain the following information.

a. For power-driven vessels 40 Meters (approx 131 ft) or more in length or when operating instructions require participation:

- Pilot
- Vessel name

- Position
- Destination
- Draft
- Route (see section on route intentions below)
- Tug frequency

b. For a towing vessel 8 meters (approx 26 ft) or more in length if towing astern/alongside or pushing ahead:

- Vessel name
- Position
- Destination
- Towing/pushing/alongside
- Barge over/under 1600 gross tons
- Draft

c. For a vessel certificated to carry 50 or more passengers for hire, engaged in trade report:

- Vessel name
- Position
- Destination
- Route

The passenger vessel may also request or decline a traffic report. If a request or decline of the report is not stated the VTS controller will provide a traffic report.
Note: For passenger vessels on a scheduled or published route as defined in 33CFR 161.23, the sailing plan time requirement is at least 5 minutes before entering the VTS area.

2. **Position Reports** (a lat/long, bearing & range from a specific point, or description of vessel's position in relation to a know geographic point) shall be made:

- Once a vessel is actually underway or upon entry into a VTS area;
- When passing a reporting point (see below list of reporting points);
- After pilot change, departure of pilot, or other change in person directing the movement of the vessel.
- Ferry and tour boats are required to call at least every 30 minutes.

3. **Final Report**. Report to VTS upon docking, anchoring, mooring or departing the VTS Area as applicable.

Inshore Sector Reporting Points

The recent implementation of AIS has eliminated the need for voice position reports at designated points for all vessels with a properly installed and operating AIS unit. For those vessels without installed AIS, VMRS Users are directed to contact VTS at the following listed reporting points.

Pilot Area/Point of Entry into VTS Area

San Mateo Bridge
Redwood Creek Entrance Light 2
Dumbarton Bridge

Richmond-San Rafael Bridge
'E' Buoy San Pablo Strait Channel

Petaluma Channel Daybeacon 19
Mare Island Strait Light 1

Mare Island Causeway bridge (when inbound/outbound Mare Island Strait)

Carquinez Bridge
Military Oceans Terminals Concord (MOTCO)
New York Point
Antioch Bridge
Prisoners Point
Rio Vista Bridge
Sacramento Deep Water Channel Light 51 & Light 65

Note: Additional reporting points may be required due to vessel impairments, meteorological conditions, or VTS equipment outages.

For a **Marine Event** comprised of committee boat, race deck, or event organizer, report to VTS the following information:

- Committee boat name
- Event name, sponsor name, & permit #
- Number & type of vessels
- Event location
- Radio guard channel
- Start & stop time

ROUTE INTENTIONS

All vessels shall be aware of and follow the San Francisco Bay traffic routing system. This system consists of a Traffic Separation Scheme (TSS) offshore and Regulated Navigational Areas (RNAs) in the Inshore Sector (see pages 7 & 8). Any decision to deviate from the TSS or RNA must be made by the master or person in charge of the vessel. You shall notify the VTS prior to deviating from TSS or RNA.

The traffic lanes radiating seaward from the offshore precautionary area centered on the San Francisco Sea Buoy constitute a Traffic Separation Scheme (TSS) adopted by the International Maritime Organization (IMO). COLREGS Rule 10 applies to vessels in or near this TSS.

The geographic constraints of San Francisco Bay make implementation of a TSS impractical and unnecessarily restrictive on recreational and harbour tour boats. Instead, traffic flow within the Bay is guided by a series of RNAs.

Participants unable to follow the traffic lanes or VTS procedures due to an emergency should manoeuvre as required to minimize the emergency and notify VTS as soon as possible.

The recreational boating public have a legitimate expectation that ships will adhere to the traffic routing system. Therefore, particularly in central San Francisco Bay (where many boats are often present), the hazards of deviating from the routing system are very pronounced. VTS will only concur with a proposed deviation when a safety related reason is provided, and it affords a level of safety greater than that provided by adherence to the established traffic scheme. When a deviation does occur, VTS may make a safety broadcast on channels 14 and 16 VHF-FM to warn the boating public.

Charted recreation areas within the VTS Area shall be avoided by commercial vessels.

Excursion boats, ferries, and tour boats should comply with the traffic lanes as closely as their routes allow.

PROVIDING ROUTE INTENTIONS (when outbound for sea or transiting intrabay)
Vessels are required to provide a Sailing Plan in accordance with 33 CFR 161.19. Included in the Sailing Plan is the intended route. In the San Francisco VTS area there are often several traffic lane or bridge span choices along a route to a give destination. Therefore, it is often difficult to specify an exact route upon initial check-in. Vessels required to use the traffic lanes shall normally provide traffic lane or bridge span intentions along the route as follows:

Offshore Traffic Separation Scheme

Provide intentions when outbound *prior* to passing Point Bonita. The usual outbound options are (see figure 6, pg 9):

Northern Traffic Lane,
Western Traffic Lane,
Southern Traffic Lane, or
Bonita Channel.

Central Bay Traffic Lanes

There are three lane options: The Deep Water Traffic Lane; Westbound Lane 9south of Harding Rock); Eastbound Lane (or south of Alcatraz). Provide intentions when approaching these lanes *prior* to passing points: Point Diablo, Point Blunt, Bay Bridge.

Oakland Bay Bridge
(West of Yerba Buena Island)

When approaching from the North, provide bridge span intentions *prior* to passing Blossom Rock buoy. When approaching from the south, provide span intentions prior to entering the precautionary area.

There are situations when a vessel will require more time to determine the best lane or span selection due to other vessels navigating in the area. In these cases, the vessel shall state that more time is required and then, as soon as practicable, provide intentions.
For examples of Sailing Plan Reports, refer to the VTS website on VTS communications:
http://www.vtssf.uscg.mil/

REGULATED NAVIGATION AREAS

The Coast Guard has established regulated navigation areas (RNAs) within the San Francisco Bay region to reduce vessel congestion where maneuvering room is limited. These RNAs increase navigational safety by organizing traffic flow patterns; reducing meeting, crossing, and overtaking situations between large vessels in constricted channels; and limiting vessel speed.
The RNAs apply to all LARGE VESSELS (defined as: any power-driven vessels of 1600 or more gross tons, or tugs with a tow of 1600 or more gross tons).
When navigating within the RNAs, LARGE VESSELS shall:

- Not exceed a speed of 15 knots through the water
- Have engine(s) ready for immediate maneuver and operate engines in a control mode and on fuel that allows for an immediate response to any engine order.

San Francisco Bay RNA

LARGE VESSELS shall use the indicated direction of travel within a given lane. Eastbound travel is permitted in the Eastbound lane, westbound travel is permitted in the Westbound lane, and east or westbound travel is permitted in the Deep Water Traffic Lane (DWTL).

LARGE VESSELS shall use the DWTL if eastbound with a draft of 45 feet or greater or westbound with a draft of 28 feet or greater.

A LARGE VESSEL shall not meet, cross, or overtake another LARGE VESSEL within the DWTL when either vessel is a tank vessel in ballast, carrying certain dangerous cargoes, or bulk petroleum products (33 CFR 160.203).

Southampton Shoal/Richmond Harbor RNA

A LARGE VESSEL shall not meet, cross, or overtake another LARGE VESSEL within this RNA.

Oakland Harbor RNA

A LARGE VESSEL shall not meet, cross, or overtake another LARGE VESSEL within this RNA.
All vessels operating within these RNAs are reminded of their responsibility to comply with Rule 9 of the Inland Navigation Rules.

Pinole Shoal Channel RNA

The Pinole Shoal Channel RNA is reserved for navigation of LARGE VESSELS (this includes tugs w/tows of 1600 GT or greater) Vessels less then 1600GT are not permitted within this RNA. A LARGE VESSEL shall not enter Pinole Shoal Channel RNA, if such entry would result in meeting, crossing, or overtaking another LARGE VESSEL, when either vessel is a tank vessel in ballast, carrying certain dangerous cargoes, or bulk petroleum products.

Benicia-Martinez Railroad Bridge RNA

(This RNA applies during periods of reduced visibility)

Eastbound

Eastbound LARGE VESSELS shall not transit through this RNA when visibility is less than 1000 yards.

Westbound

Westbound LARGE VESSELS shall check visibility conditions within the RNA immediately prior to passing New York Point, and not proceed past Mallard Island until visibility improves to greater than 1000 yards within the RNA. If the visibility drops below 1000 yards during the transit, the vessel may proceed

but must obtain permission to deviate from this RNA. Visibility is considered to be 1000 yards or greater when both the Port of Benicia Pier and the Shell Martinez Pier can be seen from the Union Pacific Railroad Bridge.

Refer to the VTS website for more amplifying info on RNAs at http://www.vtssf.uscg.mil/

CAPTAIN OF THE PORT ADVISORIES

(Current as of 31 Mar 05)

COTP Advisory # 05-095 (4 May 1995): ENFORCEMENT OF NAVIGATION RULES IN SAN FRANCISCO BAY

This advisory provides a listing of the major deep draft channels in San Francisco Bay and adjacent waters which the Captain of the Port considers to be "narrow channels or fairways" within the meaning of the International and Inland Rules of the Road.

Rule 9, in both the International and Inland Rules of the Road, provide requirements for vessels navigating in the vicinity of narrow channels or fairways. Vessels and powerboats less than 20 meters (approximately 65 feet), all sailboats and vessels engaged in fishing shall not impede the passage of a vessel that can safely navigate only within a narrow channel or fairway. Additionally, a vessel shall not cross a narrow channel or fairway if such crossing impedes the passage of a vessel that can safely navigate only within that channel or fairway. The term "shall not impede" means a small craft must keep well clear and not hinder or interfere with the transit of larger vessels. Small craft and fishing vessels shall not anchor or fish in narrow channels if large vessels or barges being towed are transiting.

Coast Guard enforcement efforts, combined with a public education and information program, are further intended to draw public attention to the serious hazards created when smaller vessels impede large vessels. This effort should result in an improved level of navigational safety and reduce the risk of collisions, groundings and their potential consequences.

The Captain of the Port considers the following areas to be "narrow channels or fairways" for the purpose of enforcing the International and Inland Rules of the Road. This list is not all-inclusive, but identifies areas where deep draft commercial and public vessels routinely operate. Included in this list and marked by an asterisk (*) are the Regulated Navigation Areas (RNAs) in San Francisco Bay, which were designated in 33 CFR 162 and 165. [May 1995]

a. All traffic lanes and precautionary areas in the San Francisco Bay eastward of the San Francisco Approach Lighted Horn Buoy SF (LLNR 360) to the San Francisco - Oakland Bay Bridge and the Richmond - San Rafael Bridge to include:

*1. Golden Gate Traffic Lanes which include the Westbound and Eastbound Lanes west of the Golden Gate Precautionary Area.

*2. Golden Gate Precautionary Area.

*3. Central Bay Traffic Lanes, which include the Deep Water Traffic Lane, The Eastbound Lane (south of Alcatraz Island), and the Westbound Lane (south of Harding Rock).

*4. Central Bay Precautionary Area.

*5. North Ship Channel between North Channel Lighted Buoy "A" and the Richmond - San Rafael Bridge.

*6. Southampton Shoal Channel including the Richmond Long Wharf maneuvering area.

*7. Richmond Harbor Entrance Channel and the Point Potrero Reach ending at Point Potrero Turn and including the Turn Basin at Point Richmond.

8. Point Potrero Turn.

9. Richmond Harbor Channel in its entirety. 10. Santa Fe Channel in its entirety.

*b. Oakland Harbor Bar Channel including the Outer Harbor Entrance Channel and the Inner Harbor Entrance Channel.

c. Oakland Outer Harbor.

d. Oakland Inner Harbor from Inner Harbor Channel Light "5" (LLNR 4670) to, and including, the Brooklyn Basin South Channel.

e. Alameda Naval Air Station Channel in its entirety.

f. South San Francisco Bay Channels between the central Bay Precautionary Area and Redwood Creek Entrance Light "2" (LLNR 5180).

g. Redwood Creek between Redwood Creek Entrance Light "2" (LLNR 5180) and Redwood Creek Daybeacon "21 " (LLNR 5265).

*h. San Pablo Straight Channel from the Richmond-San Rafael Bridge to San Pablo Bay Channel Light "7" (LLNR 5900).

*i. Pinole Shoal Channel in San Pablo Bay between San Pablo Bay Channel Light "7" (LLNR 5900) and San Pablo Bay Channel Light "14" (LLNR 5935).
j. Carquinez Strait between San Pablo Bay Channel Light "14'.' (LLNR 5935) and the Benicia-Martinez Highway Bridge.
k. Mare Island Strait between Mare Island Strait Light "2" (LLNR 6095) and Mare Island Causeway Bridge.
l. Suisun Bay Channels between the Benicia-Martinez Highway Bridge and Suisun Bay Light "34" (LLNR 6655).
m. New York Slough between Suisun Bay Light "30" (LLNR 6585) and San Joaquin River Light "2" (LLNR 6670).
n. Sacramento River Deep Water Ship Channel from Suisun Bay Light "34" (LLNR 6655) to the Port of Sacramento.
o. San Joaquin River from San Joaquin River Light "2" (LLNR 6670) to the port of Stockton.

Rules of the Road Enforcement: Timely reporting and enforcement of Rules of the Road infractions promotes safer navigation. Vessel masters, pilots, and operators are encouraged to report incidents, which merit investigation. Reports will be fully investigated and may result in license suspension or revocation proceedings or the assessment of civil penalties.

COTP Advisory # 05-094 (4 May 1995): POLLUTION PREVENTION REGULATIONS

This notice addresses the application of the Pollution Prevention regulations in Title 33 Code of Federal Regulations (CFR) Parts 154, 155, and 156 to vessels and facilities operating in the Captain of the Port (COTP) San Francisco Bay zone.

The Pollution Prevention regulations apply to waterfront facilities and vessels that conduct bulk oil or hazardous material transfers. Sections of the applicable regulations give the COTP discretionary authority to impose additional requirements or modify certain requirements depending on port-specific needs.

a. **Advance notice of oil and hazardous material transfers (33 CFR 156.118)**

Vessels or mobile facilities conducting transfers, bunkering, or lightering must notify the COTP of the time and place of each transfer operation at least 4 hours before the transfer begins. Fixed facilities are not required to provide the COTP with transfer notifications, unless specifically required to do so in an alternative procedure or other COTP instruction. Provide all transfer notifications to the MSO San Francisco Bay watch office by calling (510) 437-3073 (24-hour number) or by FAX at (510) 437-3072. The 4-hour advance notice must include the following information:

- The scheduled start date and time of the transfer
- The estimated duration of the transfer
- The specific location of the transfer
- The type of transfer (mobile, bunkering, or lightering)
- The names of vessels and mobile facilities involved in the transfer
- The name and contact phone number of the qualified individual
- The name, company affiliation, and contact number for the reporting person
- The amount and type or product for transfer

If the time of a transfer changes by one hour or more, or if a transfer is canceled, the Person in Charge of the truck or vessel shall notify the MSO watch office as soon as possible. The COTP recognizes that certain situations arise when it is not possible to provide a full 4-hour transfer notification. In these situations, facility or vessel operators should contact the MSO watch office and request permission to conduct the transfer. The COTP will grant such permission on a case-by-case basis.

b. **Loading over the top (33 CFR 156.120(g))**

Vessels or tank cleaning facilities sometimes transfer cargo into or from deep tanks or remove settled petroleum products from cargo tanks through an open hatch. Due to the static electricity combustion hazards and the amount of hazardous fumes generated by free-falling petroleum products, operators who regularly conduct these transfers should comply with the fixed connection requirements of 33 CFR 156.120(g). For those situations when compliance with the fixed connection requirement is impracticable, operators shall request an alternative from the COTP. Requests for alternatives should include proposed procedures that provide an equivalent level of safety and environmental protection. Depending on the type of operation involved. The COTP may grant a long-term alternative or require case-by-case alternatives.

c. **Plugging drains and scuppers prior to transfer (33 CFR 156.120(o))**

Before conducting transfer operations, tank vessel operators must close all scuppers and drains within a containment area using suitable mechanical means. Wooden or similar plugs are acceptable provided that cement is applied uniformly around the plug to prevent spilled oil from leaking through. Do not use rags or other easily permeated material.

d. **Person in Charge of transfer operation (33 CFR 156.120(t)(1))**

Persons in Charge of oil or hazardous material transfers must be present at the site of a transfer and be immediately available to the transfer personnel during all evolutions. A Person in Charge is "present at the site" if he or she is:

- Within line of sight of the transfer operation; and
- In constant communication with the other Person in Charge (vessel or facility).

When Coast Guard inspectors board a tank vessel or arrive at a transfer facility during a transfer operation and do not see a Person in Charge monitoring the operation, they will wait for 3 minutes. If the appropriate Person in Charge is not seen within 3 minutes, the inspectors will deem the Person in Charge not present at the site of the transfer operation.

In such a case, the inspectors may shut down the transfer operation and process a civil penalty recommendation. All Persons in Charge must be present at the site of a transfer and must be fully aware of all aspects of a transfer operation from start to finish.

e. **Bunkering of vessels at anchorage**

Due to numerous environmentally sensitive areas, bunkering of vessels at anchorage within San Francisco Bay is permitted **only in Anchorage 9**.

Because of its size and location, Anchorage 9 affords the best opportunity for containment and recovery in the event of an oil spill.

The COTP will consider requests to bunker at other anchorages on a case-by-case basis. Submit such requests to the COTP in writing no later than 24 hours prior to the estimated start time.

f. **Lightering zones and advance notice of lightering (33 CFR 156.215)**

The master, owner, or agent of each vessel to be lightered must give at least 24 hours advance notice to the COTP prior to arrival in the lightering location or zone. Advance notice must include the following information:

- The vessel's name, call sign or official number, and registry
- The cargo type (if oil) or shipping name (if hazardous material) and the approximate amount on board
- The number of transfers expected and the amount of cargo expected to be transferred

- The lightering location
- The estimated time of arrival in the lightering location
- The estimated duration of the transfer operation
- The name and destination of service vessels

If the estimated time of arrival in the lightering location changes by more than 6 hours, the master, owner, or agent must advise the COTP of this change as soon as possible.

If a vessel must conduct an "immediate" lightering due to unforeseen circumstances, the vessel operator should contact the MSO watch office and request permission to conduct the lightering. The COTP will grant approval on a case-by-case basis.

Due to numerous environmentally sensitive areas, lightering within San Francisco Bay is permitted **only in Anchorage 9**. Because of its size and location, Anchorage 9 affords the best opportunity for containment and recovery in the event of an oil spill.

The COTP will consider requests to lighter at other anchorages on a case-by-case basis. Submit such requests to the COTP in writing no later than 24 hours prior to the estimated start time.

g. **Vessel mooring during transfer operations (33 CFR 156.120(a))**

During transfer operations, a transferring vessel's moorings must be strong enough to hold during all expected conditions of surge, current, and weather and must be long enough to allow adjustment for changes in draft, drift, and tide during a transfer operation.

Many of the bulk oil facilities located along the Carquinez Strait are subject to very high velocity currents during the Spring runoff season (January through May). In some cases, strong currents have caused tank vessels to break their mooring lines or drift several feet away from berth during transfer operations. Facility and vessel operators should be aware of environmental conditions that affect vessel mooring, and should take appropriate precautions to ensure secure moorings. Depending on environmental conditions at a particular facility, precautions may include using wire mooring lines, having tugs on scene, installing current flow and current direction meters, installing pelican hook moorings with tension gauges, and conducting a comprehensive mooring analysis to better understand forces exerted on a ship at various depths and at various tidal cycles.

h. **Mobile facility pollution response equipment requirements (33 CFR 154.1040(d))**

Mobile facility operators must have at least 200 feet of containment boom and the means of deploying and anchoring the boom available at a spill site within 1 hour of the detection of a spill. In addition, there must be adequate absorbent material on scene within 1 hour for an initial response to an average most probable discharge.

The intent of this requirement is to ensure facility operators can initiate an effective immediate response in accordance with procedures listed in their facility response plans. To assess operator preparedness to respond to an average most probable discharge, the Coast Guard conducted a series of unannounced exercises involving mobile facilities during the summer of 1996. The Coast Guard found that facility operators who carried a small inventory of response equipment (absorbent boom and pads) with them to all transfer locations were the most prepared to meet the one hour response requirement. Facilities that relied exclusively on an oil spill removal organization (OSRO) or facility-owned equipment stored at a central location were generally less prepared to meet the response requirement, depending on the transfer location and the proximity of that location to the response equipment warehouse or yard.

Facility operators should assess their initial response capabilities for all transfer locations to ensure equipment availability and response time requirements are met. When evaluating initial response

capabilities, operators should consider such factors as distance, heavy traffic, and other possible delays. Operators should reevaluate this assessment during the annual response plan review process.

Compliance with the Pollution Prevention Regulations and this Advisory will reduce the risk of pollution incidents during transfer operations and mitigate the potential environmental damage should incidents occur.

ANCHORAGES

A. VTS San Francisco administers the anchorages in the VTS area for the COTP. Anchorage regulations for the service area are found in Title 33 CFR § 110.224. These regulations describe the boundaries of designated anchorage areas, impose certain restrictions on anchoring, and require various reports from vessels anchoring both in and outside of the designated anchorages. Vessels that have notified the Vessel Traffic Center (VTC) of their actions will be considered in compliance with the reporting requirements of 33 CFR § 110.224.

B. VTS administration of the anchorages includes ensuring proper separation of anchored vessels to prevent their swinging or drifting into each other. The COTP has established a mandatory separation of 750 yards around anchored vessels over 300 gross tons. Vessels anchoring within 750 yards, or which "settle out" within 750 yards of another vessel will be directed by the VTS to re-anchor at a greater distance. The vessel that was the last to arrive will normally be the one required to move.

C. Any vessel anchoring outside of established anchorages should notify VTS immediately. Anchoring offshore is strictly forbidden. Exceptions may be made for vessel engine casualties or severe weather preventing transit into port on a case-by-case basis, notification to the VTS is required prior to anchoring offshore. A vessel anchoring outside an established anchorage area should be positioned outside the vessel traffic lanes or ship channel insofar as practicable. If necessary to anchor within a traffic lane or channel, the vessel should be positioned as near the edge of the lane or channel as practicable.

D. When the wind is above 25 knots all vessels over 300 gross tons anchored in the San Francisco Bay must maintain a continuous radiotelephone watch of VHF-FM ch. 13 and ch. 14.

E. Vessels anchoring in any anchorage are required to reserve the deeper portions of the anchorage for vessels of deeper draft. This becomes particularly important in Anchorage 9, since tankers with drafts up to 50 feet often anchor there to conduct lightering. Therefore, the VTS advises vessels anchoring in Anchorage 9 to anchor as far east or south as safety will allow. This will ensure that the deeper western side of the anchorage will be available for those deep draft vessels needing it. Shallow-draft vessels may be required to move if they are in which they are anchored is needed by a vessel of deeper draft.

F. No vessel may anchor in a "dead ship" status (propulsion or control unavailable for normal operation) at any anchorage other than Anchorage 9 without the prior approval of the Captain of the Port. Any vessel anchoring in a "dead ship" status shall have one assist tug of adequate bollard pull on standby and immediately available (maximum of 15 minute response time) to provide emergency maneuvering. When the sustained winds are 20 knots or greater, of when the wind gusts are 25 knots or greater, the tug must be alongside.

NOTES: a. When sustained winds are in excess of 25 knots each vessel greater than 300 gross tons using this anchorage shall maintain on continuous radio watch VHF channel 14 and channel 13. A person who fluently speaks the English language must maintain this radio watch.
b. Each vessel using this anchorage may not project into adjacent channels or fairways.
c. This anchorage is primarily for use by vessels requiring a temporary anchorage waiting to proceed to pier facilities or anchorage grounds.
d. Each vessel using this anchorage may not remain for more than 12 hours unless authorized by the COTP.
e. Each vessel using this anchorage shall be prepared to move within 1-hour notification by the COTP.
f. The maximum total quantity of explosives that may be on board a vessel using this anchorage shall be limited to 3,000 tons unless otherwise authorized with the written permission of the COTP.
g. The maximum total quantity of explosives that may be on board a vessel using this anchorage shall be limited to 50 tons except that, with the written permission of the COTP, each vessel in transit, loaded with explosives in excess of 50 tons, may anchor temporarily in this anchorage provided that the hatches to the folds containing explosives are not opened.
h. Each vessel using this anchorage will be assigned a berth by the COTP on the basis of the maximum quantity of explosives that will be on bard the vessel.
j. Each vessel using this anchorage shall promptly notify the COTP upon anchoring and upon departure.
k. Restricted areas in the vicinity of the Maritime Administration Reserve Fleet.

l. Vessel using this anchorage must exceed 15 feet draft, have engines on standby, and have a pilot on board.

m. Any vessel anchoring in a "dead ship" status shall have one assist tug of adequate bollard pull on standby and immediately available (maximum of 15 response time) to provide emergency maneuvering. When the sustained winds are 20 knots or greater, or when the wind gusts are 25 knots or greater, the tug must be alongside.

FEDERAL REGULATIONS

DEPARTMENT OF TRANSPORTATION

Excerpts from Coast Guard 33 CFR Parts 1, 26, 160, 161, 162, and 165

PART 1--GENERAL PROVISIONS

1. The authority citation for part 1 continues to read as follows: Authority: 14 U.S.C. 663; Sec. 6097(d), Pub. L. 100-690, 102 Stat. 4181; 49 CFR 1.45(b), 1.46; section 1.01-70 also issued under the authority of E.O. 12316, 46 CFR 42237.
2. In 1.01-30, paragraph (b) is added to read as follows:

§1.01-30 Captains of the Port. ****

(a) Captains of the Port and their representatives enforce within their respective areas port safety and security and marine environmental protection regulations, including, without limitation, regulations for the protection and security of vessels, harbors, and waterfront facilities; anchorages; security zones; safety zones; regulated navigation areas; deepwater ports; water pollution; and ports and waterways safety.
(b) Subject to the supervision of the cognizant Captain of the Port and District Commander, Commanding officers, Vessel Traffic Services, are delegated authority under the Ports and Waterways Safety Act to discharge the duties of the Captain of the Port that involve directing the operation, movement, and anchoring of vessels within a Vessel Traffic Service area, including management of vessel traffic within anchorages, regulated navigation areas and safety zones, and to enforce Vessel Traffic Service and ports and waterways safety regulations. This authority may be re-delegated.
(c) Under authority conferred by 14 U.S.C. 89, any commissioned, warrant or petty officer of the United States Coast Guard may assist in discharging the duties of the Captain of the Port in any port or adjacent navigable waters of the United States. They will do so under the supervision of the cognizant Captain of the Port, or representative of the Captain of the Port, if there be one fort the locality involved.

PART 26--VESSEL BRIDGE-TO-BRIDGE RADIOTELEPHONE REGULATIONS

§ 26.01 Purpose.
(a) The purpose of this part is to implement the provisions of the Vessel Bridge-to-Bridge Radiotelephone Act. This part:
(1) Requires the use of the vessel bridge-to-bridge radiotelephone;
(2) Provides the Coast Guard's interpretation of the meaning of important terms in the Act;
(3) Prescribes the procedures for applying for an exemption from the Act and the regulations issued under the Act and a listing of exemptions.
(b) Nothing in this part relieves any person from he obligation of complying with the rules of the road and the applicable pilot rules.

§ 26.02 Definitions.
For the purpose of this part and interpreting the Act:
Secretary means the Secretary of the Department in which the Coast Guard is operating; *Act* means the ``Vessel Bridge-to-Bridge Radiotelephone Act'', 33 U.S.C. sections 1201-1208; Length is measured from end to end over the deck excluding sheer;
Power-driven vessel means any vessel propelled by machinery;
Towing vessel means any commercial vessel engaged in towing another vessel astern, alongside, or by pushing ahead.
Vessel Traffic Services (VTS) means a service implemented under Part 161 of this chapter by the United States Coast Guard designed to improve the safety and efficiency of vessel traffic and to protect the environment. The VTS has the capability to interact with marine traffic and respond to traffic situations developing in the VTS area.
Vessel Traffic Service Area or *VTS Area* means the geographical area encompassing a specific VTS area of service as described in Part 161 of this chapter. This area of service may be subdivided into sectors for the purpose of allocating responsibility to individual Vessel Traffic Centers or to identify different operating requirements.

Note: Although regulatory jurisdiction is limited to the navigable waters of the United States, certain vessels will be encouraged or may be required, as a condition of port entry, to report beyond this area to facilitate traffic management within the VTS area.

§ 26.03 Radiotelephone required. *****

(a) Unless an exemption is granted under Sec. 26.09 and except as provided in paragraph (a)(4) of this section, this part applies to:
(1) Every power-driven vessel of 20 meters or over in length while navigating;
(2) Every vessel of 100 gross tons and upward carrying one or more passengers for hire while navigating;
(3) Every towing vessel of 26 feet or over in length while navigating; and
(4) Every dredge and floating plant engaged in or near a channel or fairway in operations likely to restrict or affect navigation of other vessels except for an unmanned or intermittently manned floating plant under the control of a dredge.
(b) Every vessel, dredge, or floating plant described in paragraph (a) of this section must have a radiotelephone on board capable of operation from its navigational bridge, or in the case of a dredge, from its main control station, and capable of transmitting and receiving on the frequency or frequencies within the 156-162 Mega-Hertz band using the classes of emissions designated by the Federal Communications Commission for the exchange of navigational information.
(c) The radiotelephone required by paragraph (b) of this section must be carried on board the described vessels, dredges, and floating plants upon the navigable waters of the United States.
(d) The radiotelephone required by paragraph (b) of this section must be capable of transmitting and receiving on VHF FM channel 22A (157.1 MHz).
(e) *********
(f) In addition to the radiotelephone required by paragraph (b) of this section, each vessel described in paragraph (a) of this section while transiting any waters within a Vessel Traffic Service Area, must have on board a radiotelephone capable of transmitting and receiving on the VTS designated frequency in Table 26.03(f) (VTS Call Signs, Designated Frequencies, and Monitoring Areas).
Note: A single VHF-FM radio capable of scanning or sequential monitoring (often referred to as ``dual watch" capability) will not meet the requirements for two radios.

§ 26.04 Use of the designated frequency

(a) No person may use the frequency designated by the Federal Communication Commission under section 8 of the Act. 33 USC 1207 (a), to transmit any information other than information necessary for the safe navigation of vessels or necessary tests.
(b) Each person who is required to maintain a listeining watcher under section 5 of this Act shall, when necessary, transmit and confirm, on the designated frequency, the intentions of this vessel and other information necessary for the safe navigation of vessels.
(c) Nothing in these reuglation may be const4rued as prohibiting the use of the disignated frequency to communicate with shore stations to obtain or furnish information necessary for the safe navigation of vessels.
(d) On the navigatable waters of the United States within a VTS area, the disignated VTS frequency is an additional deisgnated frequency required to be monitored in accordance with §26.05.
Note: As stated in 47 CFR 8-.148(b), a VHF watch on Channel 16 (156.800 MHz) is not required on vessels subject to the Vessel Bridge-to-Bridge Radiothelphone Act and participating in a Vessel Traffic Service (VTS) system when the watch is maintained on both the vessel bridge-to-bridge frequency and a designated VTS frequency.

§ 26.05 Use of radiotelephone

Section 5 of the Act states:
(a) The radiotelephone required by this Act is for the exclusive use of the master or person in charge of the vessel, or the person designated by the master or person in charge to pilot or direct the movement of the vessel, who shall maintain a listening watch on the designated frequency. Nothing contained herein shall be interpreted as precluding the use of portable radiotelephone equipment to satisfy the requirements of this act.

§ 26.06 Maintenance of radiotelephone; failure of radiotelephone

Section 6 of the Act states:
(a) Whenever radiotelephone capability is required by this Act, a vessel's raiotelephone equipment shall be maintained in effective operating condition. If the radiotelephone equipment carried aboard a vessel ceases to operate the master shall exercise due diligence to restore it or cause is to be restored to effective operating condition at the earliest practicable time. The failure of a vessel's readiotelephone equipment

shall not, in itself, constitute a violation of this Act, nor shall it obligate the master of any vessel to moor or anchor his vessel; however, the loss of radiotelephone capbility shally be given consideration in the navigation of the vessel.

§ 26.07 Communications.
No person may use the services of, and no person may serve as, a person required to maintain a listening watch under section 5 of this Act, 33 U.S.C. 1204, unless the person can communicate in the English lanquage.

§ Exemption procedures
(a) Any person may petition for an exemption from any provision of the Act or this part;
(b) Each petition must be submitted in writing to U.S. Coast Guard, Marine Safety and Environmental Protection, 2100 Second Street S Washington, DC 20593-0001, and must state;
(1) The provision of the Act or this part from which an exemption is requested; and
(2) The reasons why marine navigation will not be adversely affected if the exemption is granted and if the exemption relates to a local communications system how that system would fully comply with the intent of the concept of the Act but would not conform in detail if the exemption is granted

§ 26.09 List of exemptions.
****

PART 160 PORTS AND WATERWAYS SAFETY: GENERAL
The authority citation for part 160 continues to read as follows: Authority: 33 U.S.C. 1231: 49 CFR 1.46.9
Section 160.3 is revised to read as follows:

§ 160.3 Definitions.
For the purposes of this subchapter:
Bulk means material in any quantity that is shipped, stored, or handled without the benefit of package, label, mark or count and carried in integral or fixed independent tanks. Captain of the Port means the Coast Guard officer designated by the Commandant to command a Captain of the Port Zone as described in part **3** of this chapter.

Commandant means the Commandant of the United States Coast Guard.

Commanding Officer, Vessel Traffic Services means the Coast Guard officer designated by the Commandant to command a Vessel Traffic Service (VTS) as described in part 161 of this chapter.

Deviation means any departure from any rule in this subchapter.

District Commander means the Coast Guard officer designated by the Commandant to command a Coast Guard District as described in part **3** of this chapter.

ETA means estimated time of arrival.

Length of Tow means, when towing with a hawser, the length in feet from the stern of the towing vessel to the stern of the last vessel in tow. When pushing ahead or towing alongside, length of tow means the tandem length in feet of the vessels in tow excluding the length of the towing vessel.

Person means an individual, firm, corporation, association, partnership, or governmental entity.

State means each of the several States of the United States, the District of Columbia, the Commonwealth of Puerto Rico, Guam, American Samoa, the United States Virgin Islands, the Trust Territories of the Pacific Islands, the Commonwealth of the Northern Marianas Islands, and any other commonwealth, territory, or possession of the United States.

Tanker means a self-propelled tank vessel constructed or adapted primarily to carry oil or hazardous materials in bulk in the cargo spaces.

Tank Vessel means a vessel that is constructed or adapted to carry, or that carries, oil or hazardous material in bulk as cargo or cargo residue.

Vehicle means every type of conveyance capable of being used as a means of transportation on land.

Vessel means every description of watercraft or other artificial contrivance used, or capable of being used, as a means of transportation on water.

Vessel Traffic Services (VTS) means a service implemented under Part 161 of this chapter by the United

States Coast Guard designed to improve the safety and efficiency of vessel traffic and to protect the environment. The VTS has the capability to interact with marine traffic and respond to traffic situations developing in the VTS area.

Vessel Traffic Service Area or VTS Area means the geographical area encompassing a specific VTS area of service as described in Part 161 of this chapter. This area of service may be subdivided into sectors for the purpose of allocating responsibility to individual Vessel Traffic Centers or to identify different operating requirements.

Note: Although regulatory jurisdiction is limited to the navigable waters of the United States, certain vessels will be encouraged or may be required, as a condition of port entry, to report beyond this area to facilitate traffic management within the VTS area.

VTS Special Area means a waterway within a VTS area in which special operating requirements apply.

PART 161 VESSEL TRAFFIC MANAGEMENT REGULATIONS:

Authority: 33 U.S.C. 1223, 1231; 46 U.S.C. 70114, 70117; Pub. L. 107-295, 116 Stat. 2064; Department of Homeland Security Delegation No. 0170.1.

General Rules

(a) The purpose of this part is to promulgate regulations implementing and enforcing certain sections of the Ports and Waterways Safety Act (PWSA) setting up a national system of Vessel Traffic Services that will enhance navigation, vessel safety, and marine environmental protection, and promote safe vessel movement by reducing the potential for collisions, rammings, and groundings, and the loss of lives and property associated with these incidents within VTS areas established hereunder.

(b) Vessel Traffic Services provide the mariner with information related to the safe navigation of a waterway. This information, coupled with the mariner's compliance with the provisions set forth in this

part, enhances the safe routing of vessels through congested waterways or waterways of particular hazard. Under certain circumstances, a VTS may issue directions to control the movement of vessels in order to minimize the risk of collision between vessels, or damage to property or the environment.

(c) The owner, operator, charterer, master, or person directing the movement of a vessel remains at all times responsible for the manner in which the vessel is operated and maneuvered, and is responsible for the safe navigation of the vessel under all circumstances. Compliance with these rules or with a direction of the VTS is at all times contingent upon the exigencies of safe navigation.

(d) Nothing in this part is intended to relieve any vessel, owner, operator, charterer, master, or person directing the movement of a vessel from the consequences of any neglect to comply with this part or any other applicable law or regulation (e.g., the International Regulations for Prevention of Collisions at Sea, 1972 (72 COLREGS) or the Inland Navigation Rules) or of the neglect of any precaution which may be required by the ordinary practice of seamen, or by the special circumstances of the case.

Sec. 161.2 Definitions.

For the purposes of this part:

Cooperative Vessel Traffic Services (CVTS) means the system of vessel traffic management established and jointly operated by the United States and Canada within adjoining waters. In addition, CVTS facilitates traffic movement and anchorages, avoids jurisdictional disputes, and renders assistance in emergencies in adjoining United States and Canadian waters.

Hazardous Vessel Operating Condition means any condition related to a vessel's ability to safely navigate or maneuver, and includes, but is not limited to:

(1) The absence or malfunction of vessel operating equipment, such as propulsion machinery, steering gear, radar system, gyrocompass, depth sounding device, automatic radar plotting aid (ARPA), radiotelephone, Automatic Identification System equipment, navigational lighting, sound signaling devices or similar equipment.

(2) Any condition on board the vessel likely to impair navigation, such as lack of current nautical charts and publications, personnel shortage, or similar condition.

(3) Vessel characteristics that affect or restrict maneuverability, such as cargo arrangement, trim, loaded condition, underkeel clearance, speed, or similar characteristics.

Navigable waters means all navigable waters of the United States including the territorial sea of the United States, extending to 12 nautical miles from United States baselines, as described in Presidential Proclamation No. 5928 of December 27, 1988.

Precautionary Area means a routing measure comprising an area within defined limits where vessels must navigate with particular caution and within which the direction of traffic may be recommended.

Towing Vessel means any commercial vessel engaged in towing another vessel astern, alongside, or by pushing ahead.

Vessel Movement Center (VMC) means the shore-based facility that operates the vessel tracking system for a Vessel Movement Reporting System (VMRS) area or sector within such an area. The VMC does not necessarily have the capability or qualified personnel to interact with marine traffic, nor does it necessarily respond to traffic situations developing in the area, as does a Vessel Traffic Service (VTS).

Vessel Movement Reporting System (VMRS) means a mandatory reporting system used to monitor and track vessel movements. This is accomplished by a vessel providing information under established procedures as set forth in this part in the areas defined in Table 161.12(c) (VTS and VMRS Centers, Call Signs/MMSI, Designated Frequencies, and Monitoring Areas).

Vessel Movement Reporting System (VMRS) User means a vessel, or an owner, operator, charterer, Master, or person directing the movement of a vessel that is required to participate in a VMRS.

Vessel Traffic Center (VTC) means the shore-based facility that operates the vessel traffic service for the Vessel Traffic Service area or sector within such an area.

Vessel Traffic Services (VTS) means a service implemented by the United States Coast Guard designed to improve the safety and efficiency of vessel traffic and to protect the environment. The VTS has the capability to interact with marine traffic and respond to traffic situations developing in the VTS area.

Vessel Traffic Service Area or VTS Area means the geographical area encompassing a specific VTS area of service. This area of service may be subdivided into sectors for the purpose of allocating responsibility to individual Vessel Traffic Centers or to identify different operating requirements.

Note: Although regulatory jurisdiction is limited to the navigable waters of the United States, certain vessels will be encouraged or may be required, as a condition of port entry, to report beyond this area to

facilitate traffic management within the VTS area.

VTS Special Area means a waterway within a VTS area in which special operating requirements apply.

VTS User means a vessel, or an owner, operator, charterer, master, or person directing the movement of a vessel, that is:

(a) Subject to the Vessel Bridge-to-Bridge Radiotelephone Act; or

(b) Required to participate in a VMRS within a VTS area (VMRS User).

VTS User's Manual means the manual established and distributed by the VTS to provide the mariner with a description of the services offered and rules in force for that VTS. Additionally, the manual may include chartlets showing the area and sector boundaries, general navigational information about the area, and procedures, radio frequencies, reporting provisions and other information, which may assist the mariner while in the VTS area.

Sec. 161.3 Applicability.

The provisions of this subpart shall apply to each VTS User and may also apply to any vessel while underway or at anchor on the navigable waters of the United States within a VTS area, to the extent the VTS considers necessary.

Sec. 161.4 Requirement to carry the rules.

Each VTS User shall carry on board and maintain for ready reference a copy of these rules.

Note: These rules are contained in the applicable U.S. Coast Pilot, the VTS User's Manual that may be obtained by contacting the appropriate VTS, and periodically published in the Local Notice to Mariners. The VTS User's Manual and the World VTS Guide, an International Maritime Organization (IMO) recognized publication, contain additional information, which may assist the prudent mariner while in the appropriate VTS area.

Sec. 161.5 Deviations from the rules.

(a) Requests to deviate from any provision in this part, either for an extended period of time or if anticipated before the start of a transit, must be submitted in writing to the appropriate District Commander. Upon receipt of the written request, the District Commander may authorize a deviation if it is determined that such a deviation provides a level of safety equivalent to that provided by the required measure or is a maneuver considered necessary for safe navigation under the circumstances. An application for an authorized deviation must state the need and fully describe the proposed alternative to the required measure.

(b) Requests to deviate from any provision in this part due to circumstances that develop during a transit or immediately preceding a transit may be made verbally to the appropriate VTS Commanding Officer. Requests to deviate shall be made as far in advance as practicable. Upon receipt of the request, the VTS Commanding Officer may authorize a deviation if it is determined that, based on vessel handling characteristics, traffic density, radar contacts, environmental conditions and other relevant information, such a deviation provides a level of safety equivalent to that provided by the required measure or is a maneuver considered necessary for safe navigation under the circumstances.

Services, VTS Measures, and Operating Requirements

Sec. 161.10 Services.

To enhance navigation and vessel safety, and to protect the marine environment, a VTS may issue advisories, or respond to vessel requests for information, on reported conditions within the VTS area, such as:

(a) Hazardous conditions or circumstances;

(b) Vessel congestion;

(c) Traffic density;

(d) Environmental conditions;

(e) Aids to navigation status;

(f) Anticipated vessel encounters;

(g) Another vessel's name, type, position, hazardous vessel operating conditions, if applicable, and intended navigation movements, as reported;

(h) Temporary measures in effect;
(i) A description of local harbor operations and conditions, such as ferry routes, dredging, and so forth;
(j) Anchorage availability; or
(k) Other information or special circumstances.

Sec. 161.11 VTS measures.

(a) A VTS may issue measures or directions to enhance navigation and vessel safety and to protect the marine environment, such as, but not limited to:
(1) Designating temporary reporting points and procedures;
(2) Imposing vessel operating requirements; or
(3) Establishing vessel traffic routing schemes.
(b) During conditions of vessel congestion, restricted visibility, adverse weather, or other hazardous circumstances, a VTS may control, supervise, or otherwise manage traffic, by specifying times of entry, movement, or departure to, from, or within a VTS area.

Sec. 161.12 Vessel operating requirements.

(a) Subject to the exigencies of safe navigation, a VTS User shall comply with all measures established or directions issued by a VTS.
(b) If, in a specific circumstance, a VTS User is unable to safely comply with a measure or direction issued by the VTS, the VTS User may deviate only to the extent necessary to avoid endangering persons, property or the environment. The deviation shall be reported to the VTS as soon as is practicable.
(c) When not exchanging voice communications, a VTS User must maintain a listening watch as required by Sec. 26.04(e) of this chapter on the VTS frequency designated in Table 161.12(c) (VTS and VMRS Centers, Call Signs/MMSI, Designated Frequencies, and Monitoring Areas). In addition, the VTS User must respond promptly when hailed and communicate in the English language.
Note to Sec. 161.12(c): As stated in 47 CFR 80.148(b), a very high frequency watch on Channel 16 (156.800 MHz) is not required on vessels subject to the Vessel Bridge-to-Bridge Radiotelephone Act and participating in a Vessel Traffic Service (VTS) system when the watch is maintained on both the vessel bridge-to-bridge frequency and a designated VTS frequency.

Table 161.12(c).--VTS and VMRS Centers, Call Signs/MMSI, Designated Frequencies, and Monitoring Areas

----

Designated frequency (Channel

Center MMSI 1 Call Sign designation)--purpose 2 Monitoring area 3 4

San Francisco--003669956 ....

San Francisco Traffic.................... 156.700 MHz (Ch. 14)............. The navigable waters of the SanFrancisco Offshore Precautionary Area, the navigable waters shoreward of the San Francisco Offshore Precautionary Area east of 122[deg]42.0[min] W. and north of 37[deg]40.0[min] N. extending eastward through the Golden Gate, and the navigable waters of San Francisco Bay and as far east as the port of Stockton on the San Joaquin River, as far north as the port of Sacramento on the Sacramento River.

San Francisco Traffic.................... 156.600 MHz (Ch. 12)............. The navigable waters within a 38 nautical mile radius of Mount Tamalpais (37[deg]55.8[min] N., 122[deg]34.6[min] W.) west of 122[deg]42.0[min] W. and south of 37[deg]40.0[min] N and excluding the San Francisco Offshore Precautionary Area.

Notes:

1 Maritime Mobile Service Identifier (MMSI) is a unique nine-digit number assigned that identifies ship stations, ship earth stations, coast stations, coast earth stations, and group calls for use by a digital selective calling (DSC) radio, an INMARSAT ship earth station or AIS. AIS requirements are set forth in Sec. Sec. 161.21 and 164.46 of this subchapter. The requirements set forth in Sec. Sec. 161.21 and 164.46 of this subchapter apply in those areas denoted with a MMSI number.

2 In the event of a communication failure, difficulties or other safety factors, the Center may direct or permit a user to monitor and report on any other designated monitoring frequency or the bridge-to-bridge navigational frequency, 156.650 MHz (Channel 13) or 156.375 MHz (Ch. 67), to the extent that doing so provides a level of safety beyond that provided by other means. The bridge-to-bridge navigational frequency, 156.650 MHz (Ch. 13), is used in certain monitoring areas where the level of reporting does not warrant a designated frequency.

3 All geographic coordinates (latitude and longitude) are expressed in North American Datum of 1983 (NAD 83).

4 Some monitoring areas extend beyond navigable waters. Although not required, users are strongly encouraged to maintain a listening watch on the designated monitoring frequency in these areas. Otherwise, they are required to maintain watch as stated in 47 CFR 80.148.

5 Until rules regarding VTS Lower Mississippi River and VTS Port Arthur are published, vessels are exempted of all VTS and VMRS requirements set forth in 33 CFR part 161, except those set forth in Sec. Sec. 161.21 and 164.46 of this subchapter.

6 A Cooperative Vessel Traffic Service was established by the United States and Canada within adjoining waters. The appropriate Center administers the rules issued by both nations; however, enforces only its own set of rules within its jurisdiction. Note, the bridge-to-bridge navigational frequency, 156.650 MHz (Ch. 13), is not so designated in Canadian waters, therefore users are encouraged and permitted to make passing arrangements on the designated monitoring frequencies.

(d) As soon as is practicable, a VTS User shall notify the VTS of any of the following:

(1) A marine casualty as defined in 46 CFR 4.05-1;
(2) Involvement in the ramming of a fixed or floating object;
(3) A pollution incident as defined in Sec. 151.15 of this chapter;
(4) A defect or discrepancy in an aid to navigation;
(5) A hazardous condition as defined in Sec. 160.203 of this chapter;
(6) Improper operation of vessel equipment required by Part 164 of this chapter;
(7) A situation involving hazardous materials for which a report is required by 49 CFR 176.48; and
(8) A hazardous vessel operating condition as defined in Sec. 161.2.

Sec. 161.13 VTS Special Area operating requirements.

The following operating requirements apply within a VTS Special Area:

(a) A VTS User shall, if towing astern, do so with as short a hawser as safety and good seamanship permits.

(b) A VMRS User shall: (1) Not enter or get underway in the area without prior approval of the VTS;
(2) Not enter a VTS Special Area if a hazardous vessel operating condition or circumstance exists;

(3) Not meet, cross, or overtake any other VMRS User in the area without prior approval of the VTS; and

(4) Before meeting, crossing, or overtaking any other VMRS User in the area, communicate on the designated vessel bridge-to-bridge radiotelephone frequency, intended navigation movements, and any other information necessary in order to make safe passing arrangements. This requirement does not relieve a vessel of any duty prescribed by the International Regulations for Prevention of Collisions at Sea, 1972 (72 COLREGS) or the Inland Navigation Rules.

Subpart B_Vessel Movement Reporting System

Sec. 161.15 Purpose and intent.

(a) A Vessel Movement Reporting System (VMRS) is a system used to monitor and track vessel movements VTS or VMRS area. This is accomplished by requiring that vessels provide information under established procedures as set forth in this part, or as directed by the Center.

(b) To avoid imposing an undue reporting burden or unduly congesting radiotelephone frequencies, reports shall be limited to information which is essential to achieve the objectives of the VMRS. These reports are consolidated into three reports (sailing plan, position, and final).

Sec. 161.16 Applicability.

Unless otherwise stated, the provisions of this subpart apply to the following vessels and VMRS Users:

(a) Every power-driven vessel of 40 meters (approximately 131 feet) or more in length, while navigating;

(b) Every towing vessel of 8 meters (approximately 26 feet) or more in length, while navigating; or

(c) Every vessel certificated to carry 50 or more passengers for hire, when engaged in trade.

Sec. 161.17 Definitions.

As used in this subpart:

Center means a Vessel Traffic Center or Vessel Movement Center.

Published means available in a widely-distributed and publicly available medium (e.g., VTS User's Manual, ferry schedule, Notice to Mariners).

Sec. 161.18 Reporting requirements.

(a) A Center may: (1) Direct a vessel to provide any of the information set forth in Table 161.18(a) (IMO Standard Ship Reporting System);

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(2) Establish other means of reporting for those vessels unable to report on the designated frequency; or

(3) Require reports from a vessel in sufficient time to allow advance vessel traffic planning.

(b) All reports required by this part shall be made as soon as is practicable on the frequency designated in Table 161.12(c) (VTS and VMRS Centers, Call Signs/MMSI, Designated Frequencies, and Monitoring Areas).

(c) When not exchanging communications, a VMRS User must maintain a listening watch as described in Sec. 26.04(e) of this chapter on the frequency designated in Table 161.12(c) (VTS and VMRS Centers, Call Signs/MMSI, Designated Frequencies, and Monitoring Areas). In addition, the VMRS User must respond promptly when hailed and communicate in the English language.

Note: As stated in 47 CFR 80.148(b), a VHF watch on Channel 16 (156.800 MHz) is not required on vessels subject to the Vessel Bridge-to-Bridge Radiotelephone Act and participating in a Vessel Traffic Service (VTS) system when the watch is maintained on both the vessel bridge-to-bridge frequency and a designated VTS frequency.

(d) A vessel must report:

(1) Any significant deviation from its Sailing Plan, as defined in Sec. 161.19, or from previously reported information; or

(2) Any intention to deviate from a VTS issued measure or vessel traffic routing system.

(e) When reports required by this part include time information, such information shall be given using the local time zone in effect and the 24-hour military clock system.

Sec. 161.19 Sailing Plan (SP).

Unless otherwise stated, at least 15 minutes before navigating a VTS area, a vessel must report the:

(a) Vessel name and type;
(b) Position;
(c) Destination and ETA;
(d) Intended route;
(e) Time and point of entry; and
(f) Dangerous cargo on board or in its tow, as defined in Sec. 160.203 of this chapter, and other required information as set out in Sec. 160.211 and Sec. 160.213 of this chapter, if applicable.

Sec. 161.20 Position Report (PR).

A vessel must report its name and position:
(a) Upon point of entry into a VMRS area;
(b) At designated reporting points as set forth in subpart C; or
(c) When directed by the Center.

Sec. 161.21 Automated reporting.

(a) Unless otherwise directed, vessels equipped with an Automatic Identification System (AIS) are required to make continuous, all stations, AIS broadcasts, in lieu of voice Position Reports, to those Centers denoted in Table 161.12(c) of this part.

(b) Should an AIS become non-operational, while or prior to navigating a VMRS area, it should be restored to operating condition as soon as possible, and, until restored a vessel must:
(1) Notify the Center;
(2) Make voice radio Position Reports at designated reporting points as required by Sec. 161.20(b) of this part; and
(3) Make any other reports as directed by the Center.

Sec. 161.22 Final Report (FR).

A vessel must report its name and position:
(a) On arrival at its destination; or
(b) When leaving a VTS area.

Sec. 161.23 Reporting exemptions.

(a) Unless otherwise directed, the following vessels are exempted from providing Position and Final Reports due to the nature of their operation:
(1) Vessels on a published schedule and route;
(2) Vessels operating within an area of a radius of three nautical miles or less; or
(3) Vessels escorting another vessel or assisting another vessel in maneuvering procedures.
(b) A vessel described in paragraph (a) of this section must:
(1) Provide a Sailing Plan at least 5 minutes but not more than 15 minutes before navigating within the VMRS area; and
(2) If it departs from its promulgated schedule by more than 15 minutes or changes its limited operating area, make the established VMRS reports, or report as directed.

Subpart C_Vessel Traffic Service and Vessel Movement Reporting System Areas and Reporting Points

Sec. 161.50 Vessel Traffic Service San Francisco.

The VTS area consists of all the navigable waters of San Francisco Bay Region south of the Mare Island Causeway Bridge and the Petaluma River Entrance Channel Daybeacon 19 and Petaluma River Entrance Channel Light 20 and north of the Dumbarton Bridge; its seaward approaches within a 38 nautical mile radius of Mount Tamalpais (37-55.8[min] N., 122-34.6[min] W.); and its navigable tributaries as far east as the port of Stockton on the San Joaquin River, as far north as the port of Sacramento on the Sacramento River.

Exhibit H

Exhibit H

U.S. Department
of Homeland Security
United States
Coast Guard

LOCAL NOTICE TO MARINERS

District: 11 Week: 44/07

SEND CORRESPONDENCE TO:
COMMANDER
DISTRICT ELEVEN (DPW)
COAST GUARD ISLAND BUILDING 50-2
ALAMEDA, CA 94501-5100

BROADCAST NOTICE TO MARINERS - Information concerning aids to navigation and waterway management promulgated by BNM 0506-07 to BNM 0537-07 has been incorporated in this notice if still significant.

SECTION I - SPECIAL NOTICES

This section contains information of special concern to the Mariner.

SUBMITTING INFORMATION FOR PUBLICATION IN THE LOCAL NOTICE TO MARINERS

A complete set of guidelines with examples and contact information can be found on our website at http://www.uscg.mil/d11/dp/dpw or call BMC Jay Field at 510-437-2969 or e-mail D11LNM@uscg.mil.

BRIDGE INFORMATION-DISCREPANCIES AND CORRECTIONS

For bridge related issues during normal working hours Monday through Friday, contact the Eleventh Coast Guard District Bridge Section, Coast Guard Island, Building 50-2, Alameda, CA 94501-5100, telephone: 510-437-3516 Office; 510-219-4366 Cell. For emergencies or discrepancies during nights, weekends and holidays, immediately notify the nearest Coast Guard Sector Command via VHF-FM CH 16 or via telephone: San Diego & Colorado River 619-295-3121, Los Angeles 310-521-3800, San Francisco 415-399-3547, Eureka 707-839-6113. Flotsam and drift may have accumulated on and near bridge piers and abutments and mariners should approach all bridges with caution.
To REPORT A DELAY AT A DRAWBRIDGE see enclosure at the end of this document.

AUTOMATIC IDENTIFICATION SYSTEM (AIS) FOR COMMERCIAL VESSELS

All mariners using AIS are reminded to enter correct AIS data before sailing and to keep AIS data accurate and current throughout the voyage. Additional Resources for the internet web pages, and hyperlinks related to AIS in the VTS San Francisco Area can be found in the Enclosures below.

DGPS

For information regarding the DGPS system, or for status updates, contact the Petaluma Control Center at 707-765-7612/7613. Current DGPS Status is available 24 hrs per day through the Internet at: http://www.navcen.uscg.gov.

DGPS-Update 9/11/07

The US Air Force is transitioning to a new operating system for The GPS Constellation. The phased operational transition will migrate each satellite, ground antenna, monitor station and other GPS data feeds from the master control station to the architecture evolution plan new master control station in an incremental manner. Users that experience problems, anomalies or outages with GPS are requested to provide online feedback via the USCG NAVCEN'S GPS Outage worksheet at: http://www.navcen.uscg.gov/gps/gpsuserinput.htm. Mariners are encouraged to report all GPS, DGPS, Loran or AIS Problems, anomalies or outages to the USCG Navigation center at: 703-313-5900, or email: nisws@navcen.uscg.gov.

LORAN-C

For information regarding the Loran-C System, contact the Coordinator of Chain Operations West Coast at 707-765-7518. Users may address inquiries to the following U.S. Loran-C Chain Operations Control Officers: Western Pacific at 707-765-7598, West Coast at 707-765-7595, and

South Central at 703-313-5873. Current Loran-C Status is available 24 hrs per day through the Internet at: http://www.navcen.uscg.gov.

SOUTHERN CALIFORNIA-VANDENBERG DANGER ZONES

For information regarding the current Vandenberg Danger Zones status updates contact 800-648-3019 or 805-606-8825.
Chart 18720 18740

CALIFORNIA SEACOAST-WHALES-POINT CONCEPTION TO POINT DUME

Vessels transiting the Santa Barbara Channel should be aware of blue whales feeding in the channel and the shipping lanes. Blue whales, the largest animals on earth, can weigh up to 150 tons and reach 90 feet in length, and are listed as an endangered species. Since September 8,2007, two dead blue whales have been discovered in the Santa Barbara channel, and one dead blue whale was discovered in Long Beach Harbor. Mariners should exercise caution when traveling through the channel and in and out of Los Angeles and Long Beach harbors, as blue whales are currently distributed throughout southern California and will be present in feeding aggregations until about mid-November. NOAA recommends that all vessel operators transiting the Santa Barbara channel do so at speeds not in excess of 10 knots. Please report any collisions with whales or any observed dead floating whales to NOAA at 562-980-4017 or to the U.S. Coast Guard.
Chart 18740

SECTION II - DISCREPANCIES

This section lists all reported and corrected discrepancies related to Aids to Navigation in this edition. A discrepancy is a change in the status of an aid to navigation that differs from what is published or charted.

DISCREPANCIES (FEDERAL AIDS)

LLNR	Aid Name	Status	Chart No.	BNM Ref.	LNM St	LNM End
1567	San Diego Bay Submerged Jetty Light E	TRLB/REDUCED INT	18773	28/06	02/06	
7105	Stockton Channel Range H Rear Light	REDUCED INT	18653	0343-07	33/07	
7240	Sacramento River Deep water Ship Channel Light 16	TRLB/DBN DEST	18660	0367-017	33/07	
7625	Sacramento River Light 1	TRLB/DBN DMGD	18661	0408-07	36/07	
7845	Bodega Harbor Channel Range C front Light 14	TRLB/DBN DEST	18643	0298-07	27/07	
7945	Bodega Harbor Channel Daybeacon 34	MISSING/TRUB	18643	829/03	27/03	

DISCREPANCIES (FEDERAL AIDS) CORRECTED

LLNR	Aid Name	Status	Chart No.	BNM Ref.	LNM St	LNM End
305	Santa Cruz Light	WATCHING PROPERLY	18685	0520-07	43/07	44/07
3877	Morro Bay Rough Bar Warning Light	WATCHING PROPERLY	18703	0514-07	43/07	44/07
4110	Santa Cruz Light	WATCHING PROPERLY	18685	0520-07	43/07	44/07

DISCREPANCIES (PRIVATE AIDS)

LLNR	Aid Name	Status	Chart No.	BNM Ref.	LNM St	LNM End
8275	WOODLEY ISLAND MARINA LIGHT	LT EXT	18622		42/07	

DISCREPANCIES (PRIVATE AIDS) CORRECTED

LLNR	Aid Name	Status	Chart No.	BNM Ref.	LNM St	LNM End

None

PLATFORM DISCREPANCIES

Name	Status	Position	BNM Ref.	LNM St	LNM End

None

PLATFORM DISCREPANCIES CORRECTED

Name	Status	Position	BNM Ref.	LNM St	LNM End

None

SECTION III - TEMPORARY CHANGES and TEMPORARY CHANGES CORRECTED

This section contains temporary changes and corrections to Aids to Navigation for this edition. When charted aids are temporarily relocated for dredging, testing, evaluation, or marking an obstruction, a temporary correction shall be listed in Section IV giving the new position.

TEMPORARY CHANGES

LLNR	Aid Name	Status	Chart No.	BNM Ref.	LNM St	LNM End
4630	Oakland Outer Harbor Lighted Buoy 3	RELOCATED FOR DREDGING	18650	283-07	25/07	
4665	Oakland Inner Harbor Lighted Buoy 5	DISCONTINUED FOR DREDGING	18650	0353-06	22/06	
4669	Oakland Inner Harbor Lighted Buoy 4	RELOCATED FOR DREDGING	18650	379-06	25/06	
4684	Oakland Inner Harbor Turn Basin Light B	TRLB	18650	0309-06	20/06	

TEMPORARY CHANGES CORRECTED

LLNR	Aid Name	Status	Chart No.	BNM Ref.	LNM St	LNM End

None

PLATFORM TEMPORARY CHANGES

Name	Status	Position	BNM Ref.	LNM St	LNM End

None

PLATFORM TEMPORARY CHANGES CORRECTED

Name	Status	Position	BNM Ref.	LNM St	LNM End

None

SECTION IV - CHART CORRECTIONS

. This section contains corrections to federally and privately maintained Aids to Navigation, as w ell as NOS corrections.

This section contains corrective actions affecting chart(s). Corrections appear numerically by chart number, and pertain to that chart only. It is up to the mariner to decide w hich chart(s) are to be corrected. The follow ing example explains individual elements of a typical chart correction._

Chart Number	Chart Edition	Edition Date	Last Local Notice to Mariners	Horizontal Datum Reference	Source of Correction	Current Local Notice to Mariners
12327	91st Ed.	19-APR-97	Last LNM: 26/97	NAD 83		27/97

Chart Title: NY-NJ-NEW YORK HARBOR - RARITAN RIVER

Main Panel 2245 NEW YORK HARBOR CGD01

(Temp) ADD NATIONAL DOCK CHANNEL BUOY 3 at 40-41-09.001N 074-02-48.001W

Green can

Corrective Action — Object of Corrective Action — Position

(Temp) indicates that the chart correction action is temporary in nature. Courses and bearings are given in degrees clockw ise from 000 true. Bearings of light sectors are tow ard the light from seaw ard. The nominal range of lights is expressed in nautical miles (NM) unless otherw ise noted.

18649 **65th Ed.** **01-JUL-06** **Last LNM: 17/05** **NAD 83** **44/07**

ChartTitle: **Entrance to San Francisco Bay**

Main Panel 1823 ENTRANCE TO SAN FRANCISCO BAY. Page/Side: N/A

CGD11

ADD Sausalito Coast Guard Mooring Buoy 37-51-04.824N 122-28-22.020W

18650 **54th Ed.** **01-OCT-05** **Last LNM: 15/05** **NAD 83** **44/07**

ChartTitle: **San Francisco Bay Candlestick Point to Angel Island**

CHART CA - SAN FRANCISCO BAY - CANDLESTICK POINT TO ANGEL ISLAND. Page/Side: N/A

ADD	Sausalito Coast Guard Mooring Buoy	CGD11 37-51-04.824N	122-28-22.020W

18652 **34th Ed.** **01-SEP-07** **Last LNM: 17/05** **NAD 83** **44/07**

ChartTitle: **FOLIO SMALL CRAFT CHART San Francisco Bay to Antioch**

CHART CA - SAN FRANCISCO BAY TO ANTIOCH. Page/Side: N/A

ADD	Sausalito Coast Guard Mooring Buoy	CGD11 37-51-04.824N	122-28-22.020W

18653 **10th Ed.** **01-JUL-05** **Last LNM: 17/05** **NAD 83** **44/07**

ChartTitle: **San Francisco Bay-Angel Island to Point San Pedro**

Main Panel 1939 SAN FRANCISCO BAY ANGEL ISLAND TO POINT SAN PEDRO. Page/Side: N/A

ADD	Sausalito Coast Guard Mooring Buoy	CGD11 37-51-04.824N	122-28-22.020W

18744 **32nd Ed.** **01-MAR-06** **Last LNM: 12/05** **NAD 83** **44/07**

ChartTitle: **Santa Monica Bay;King Harbor**

CHART CA - Santa Monica Bay. Page/Side: N/A

ADD	El Segundo (Chevron) Mooring Buoy "A" Characteristic "A"	CGD11 at 33-54-29.400N	118-27-01.800W

SECTION V - ADVANCE NOTICES

This section contains advance notice of approved projects, changes to aids to navigation, or upcoming temporary changes such as dredging, etc. Mariners are advised to use caution while transiting these areas.

SUMMARY OF ADVANCED APPROVED PROJECTS

Approved Project(s)	Project Date	Ref. LNM
None		

Advance Notice(s)

None

SECTION VI - PROPOSED CHANGES

Periodically, the Coast Guard evaluates its system of aids to navigation to determine whether the conditions for which the aids to navigation were established have changed. When changes occur, the feasibility of improving, relocating, replacing, or discontinuing aids are considered. This section contains notice(s) of non-approved, proposed projects open for comment. SPECIAL NOTE: Mariners are requested to respond in writing to the District office unless otherwise noted (see banner page for address).

PROPOSED WATERWAY PROJECTS OPEN FOR PUBLIC COMMENT

Proposed Project(s)	Closing	Docket No.	Ref. LNM
None			

Proposed Change Notice(s)

NORTHERN CALIFORNIA - NOYO RIVER LIGHT 12 (LLNR: 8125)

The Coast Guard intends to change the Noyo River Light 12 (LLNR: 8125) to a Carmanah 701-LED. Currently, the aid is equipped with an experimental lantern with an effective intensity of 46 candela. Replacing this aid with a Carmanah 701 will reduce its effective intensity from 46 candela to 17 candela. The light characteristic will remain FL R 4s, and the nominal range will remain 3nm as advertised in the Light List. Any questions or comments please contact LTJG Baxter B. Smoak at (510) 437-5984 or Baxter.B.Smoak@uscg.mil by 02 November 2007.

Chart 18626 LNM: 40/07

SECTION VII - GENERAL

This section contains information of general concern to the Mariners. Mariners are advised to use caution while transiting these areas.

ARIZONA-CALIFORNIA-NEVADA-LORAN-C OPERATIONS

LORAN Stations Jupiter, FL (7980-Y), Las Cruces, NM (9610-X), and Middletown, CA, (9940-X) will be on air testing the LORAN DATA CHANNEL

ARIZONA-CALIFORNIA-NEVADA-LORAN-C OPERATIONS

(LDC) uninterrupted until further notice. LORAN Stations Seneca, NY (8970-X), Gillette, WY (8290-X), and Grangeville, LA (7980-Y) will be on air testing LDC between 0800 and 1500 local time Monday through Friday. LORAN Stations Dana, IN (9960-Z) and George, WA (5990-Y) are expected to begin testing LDC in the near future. The test broadcast will use pulse position modulation of a ninth pulse added one thousand microseconds after the standard pulse group. Throughout the test period the signal will meet all service performance parameters published in the 1994 spec. of the LORAN-C signal. Users should not experience and tracking errors or service interference from this test broadcast. Users will be notified of any changes to the test schedule and when the testing is complete. For more details or comments contact 703-313-5900 or www.navcen.uscg.gov.

LNM: 42/07

CALIFORNIA-MARINE EVENT-SAN FRANCISCO BAY

Icer Inc. will sponsor a wakeboarding exhibit from 1400 to 1700 on 2 November 2007, and 1159 to 1500 on 3 November 2007. Professional riders will be towed with small craft near a barge with ramps, and performing maneuvers. This event will take place in McCovey Cove/China Basin between 37-46-42N and 122-23-07W; 37-46-34N and 122-23-06W; 37-46-36N and 122-23-24W; 37-46-38N and 122-23-25W. All mariners are advised to exercise caution when transiting this area. For more details or comments contact at (415) 399-7442.

Chart 18649 LNM: 44/07

NEVADA, CALIFORNIA, ARIZONA-GPS TESTING-NELLIS AFB

The GPS Navigational Signal may be unreliable within a 152.90 NM radius of position 37-23N, 115-54W (Southern Nevada). Interference testing will take place from 23 OCT 07 through 03 NOV 07. Navigation systems that rely on GPS, such as E-911, AIS, and DSC maybe affected. During this period, GPS users are encouraged to report any service outages to the Navigation Information Service (NIS) by calling (703)313-5900 or by using the NAVCEN-s GPS problem worksheet at www.navcen.uscg.gov

LNM: 43/07

NEVADA, CALIFORNIA, ARIZONA-GPS TESTING-NELLIS AFB

The GPS Navigational Signal may be unreliable within a 167.5 NM radius of position 35-56-52N, 117-34-35W. Interference testing will take place from 30 Oct 07 through 31 Mar 08. Systems that rely on GPS, such as navigation, E-911, AIS, and DSC maybe affected. During this period, GPS users are encouraged to report any service outages to the Navigation Information Service (NIS) by calling 703-313-5900 or by using the NAVCEN's GPS problem worksheet at www.navcen.uscg.gov.

Charts: 18022 18740 LNM: 44/07

NORTHERN CALIFORNIA - OAKLAND - GEOPHYSICAL SURVEY OPERATIONS

Sea Surveyor, Inc. will be conducting a marine geophysical survey from 19 Oct 07 through 30 Oct 2007 in the Oakland Tidal Canal, located between Coast Guard Island and San Leandro Bay. The survey vessel BETTY JO will be towing geophysical sensors and monitor VHF-FM Channel 16. Mariners are advised to use caution when transiting the area. For more information contact Mr. Steve Sullivan at 707-246-3696

Chart 18650 LNM: 41/07

NORTHERN CALIFORNIA-BRIDGE-CARQUINEZ STRAIT-Updated 10/30/2007

1927 I-80 HIGHWAY BRIDGE DEMOLITION THROUGH November 2007 - Demolition of the bridge continues. Beginning June 25, 2007, 2 barges will be anchored on either side of the center pier to facilitate removal of the tower. Anchor lines will extend approximately 300 feet into the north or south navigation channel, depending on the status of the work. Only one navigational channel will be partially obstructed at a any given time. A Broadcast Notice to Mariners will be issued to inform mariners of the location of the barges at any particular time. For more information, mariners should contact California Engineering Contractors at the Carquinez Bridge via VHF-FM Ch 13, 14 or 16, or at 925-382-3544, or the Coast Guard Bridge Office at 510-437-3515, for information.

Chart 18655 LNM: 47/05

NORTHERN CALIFORNIA-BRIDGE-GRANT LINE CANAL

The Tracy Blvd Drawbridge is secured in the closed-to-navigation position due to vandalism. Estimated time of repair is unknown.

Chart 18661 LNM: 33/07

NORTHERN CALIFORNIA-BRIDGE-ISLAIS CREEK-Updated 10/18/2007

ILLINOIS STREET DRAWBRIDGE CONSTRUCTION-Drawbridge construction is in progress during daylight hours, Monday through Friday, through December 2007. The bridge deck completely spans the waterway. The navigation span of the bridge provides 5 ft vertical clearance at Mean High Water and 65 ft horizontal clearance. The navigational span of the bridge will remain in the closed-to-navigation position until the end of construction.

Chart 18650 LNM: 36/05

NORTHERN CALIFORNIA-BRIDGE-NAPA RIVER

CA RTE 37 HWY BRIDGE FENDER DAMAGE - The navigational channel span fender on the south-east side, has been damaged and is partially missing or submerged. Mariners are requested to transit the bridge with caution and avoid contact with the bridge.

Chart 18652 LNM: 25/07

NORTHERN CALIFORNIA-BRIDGE-NAPA RIVER

BRAZOS RAILROAD DRAWBRIDGE-The movable span navigational lights are extinguished.

Chart 18654 LNM: 26/07

NORTHERN CALIFORNIA-BRIDGE-PETALUMA RIVER Updated 8/27/2007

BLACKPOINT RAILROAD DRAWBRIDGE-The topmost green center span navigational lights are extinguished. Drawspan is secured in the open to navigation position.

Chart 18654 LNM: 33/07

NORTHERN CALIFORNIA-BRIDGE-SACRAMENTO RIVER

ELKHORN FERRY I-5 HIGHWAY BRIDGE fendering is riding high and may not provide protection for the bridge or passing vessels. Mariners are requested to exercise caution and avoid vessel-to-bridge contact during transit.

Chart 18664 LNM: 42/06

NORTHERN CALIFORNIA-BRIDGE-SACRAMENTO RIVER

ISLETON DRAWBRIDGE-Caltrans will have a work platform, reducing vertical clearance by 6 ft, on the non-moveable portions of the bridge from 22 October 2007 until early January 2008. Drawspan operation will not be affected. Work platform will be lighted at night with red lights.

Chart 18661 LNM: 43/07

NORTHERN CALIFORNIA-BRIDGE-SACRAMENTO RIVER

RIO VISTA DRAWBRIDGE - A 4-hour advance notice will be required for bridge openings between 9 p.m. and 5 a.m., from 22 October through 20 December 2007, due to maintenance. Vessels that can transit the bridge in the closed-to-navigation position may continue to do so at any time. The drawspan provides a vertical clearance of 17 ft. above Mean High Water in the closed-to-navigation position.

Chart 18661 LNM: 42/07

NORTHERN CALIFORNIA-BRIDGE-SACRAMENTO RIVER

The Tower Drawbridge drawspan is secured in the open to navigation position through 20 November 2007. Scaffolding reduces vertical clearance by 10 feet.

Chart 18664 LNM: 38/07

NORTHERN CALIFORNIA-BRIDGE-SACRAMENTO RIVER Updated 10/24/2007

FREEPORT DRAWBRIDGE - Caltrans is conducting maintenance on the drawspan, Sunday through Thursday, from 9 p.m. to 5:30 a.m., through November 31, 2007. A containment system will be deployed below low steel of the drawspan, reducing vertical clearance by approximately 4 feet. The containment will be lit at night with fixed red lights. Mariners are requested to use caution when transiting the bridge. The operation of the drawspan will not change during the maintenance period. Mariners can contact the Coast Guard Bridge Office, at 510-437-3515, for more information.

Chart 18662 LNM: 30/07

NORTHERN CALIFORNIA-BRIDGE-SAN FRANCISCO BAY

SAN MATEO-HAYWARD BRIDGE-The fog signal on the bridge (LLNR 5155) is inoperative.

Chart 18651 LNM: 44/07

NORTHERN CALIFORNIA-BRIDGE-SAN FRANCISCO BAY-Updated 3/19/2007

SAN FRANCISCO-OAKLAND BAY BRIDGE REPLACEMENT-EAST OF YBI: The green center span lights have been temporarily extinguished in the three spans east of the main channel span due to the presence of construction equipment in those spans. Anchor wires extending up to 1,100 ft in any direction from floating equipment may be difficult to see and mariners are advised, for their own safety, to avoid passing through the construction area by using the main navigational channel east of YBI. Barges are being used in the construction of the suspension span pier footings. There will be 800 ft of horizontal clearance between the footings. Construction equipment is lighted at night. Mariners may contact the D/B General, D/B Haakon, or the D/B Vancouver via VHF-FM Ch 66, or by telephone at 510-385-9675, to determine conditions at the bridge.

Chart 18650 LNM: 50/05

NORTHERN CALIFORNIA-BRIDGE-SAN JOAQUIN RIVER

I-5 Highway Bridge Widening project at Mossdale, CA. A temporary trestle has been installed from the south bank to within 40 feet of the north bank, for the bridge widening project, at the I-5 dual bridges. The trestle allows at least 40 feet horizontal clearance for vessels to pass between the bank and the north end of the trestle. The greatest clearance should be present during high tides. The bridge widening project will be in progress through June 2009. The temp trestle will be removed as soon as possible, when no longer required for the construction work.

Chart 18661 LNM: 30/07

NORTHERN CALIFORNIA-BRIDGE-TEN MILE RIVER-NORTH OF FT BRAGG

CA RTE 1 HWY BRIDGE REPLACEMENT AND TEMP TRESTLE THROUGH March 2009. In water temporary trestle construction has begun. The temp trestle will be in place until completion of the replacement bridge, presently scheduled for March 1, 2009.

Chart 18620 LNM: 25/07

NORTHERN CALIFORNIA-CAPSIZED BARGE-SAN FRANCISCO BAY-Updated 9/12/2006

In position 37-43.43N, 122-20.25W, in the southern portion of Anchorage 9. The barge contents, reported as gravel, have been emptied into the San Francisco Bay. Charted depths may not be accurate in close proximity to this location. Mariners are requested to avoid the area. Traffic unable to avoid the area is requested to contact San Francisco Traffic on VHF-FM CH 14 for clearance. For more details or comments contact the Marine Safety Office Duty Officer at 415-399-3547.

Chart 18650 LNM: 39/05

NORTHERN CALIFORNIA-CONSTRUCTION-PORT OF OAKLAND

Manson Construction will be performing waterside work in the vicinity of Berth 35 and 37, Port of Oakland through 20 December, 2007. Hours of operation are from 0630-1730 Monday through Friday. Mariners are requested to transit at a "slow bell" to prevent injury and property damage. No VHF/FM channel will be monitored. For more information, contact Mr. Bill Partridge at 510-451-4965.

Chart 18650 LNM: 36/07

NORTHERN CALIFORNIA-CONSTRUCTION-SAN FRANCISCO

The Salt River Construction Company will be conducting Marina Construction operations in the Paradise Cay Marina from 11 September 2007 through November 2007. The dredge/dump barge the Barbara Ann and the tug Irene Lauritzen will be on the scene and monitoring VHF-FM Ch 13, 14, and 78. There will be one temporary anchor ball with barge placed by Salt River outside of and east of the channel entrance of the Paradise Cay Marina. Mariners are advised to use caution when transiting these areas. For more details or comments contact Rick Moseley at 415-435-1024.

Chart 18649 LNM: 38/07

NORTHERN CALIFORNIA-DREDGING-CRESENT CITY HARBOR

The Crescent City Harbor District will commence hydraulic dredging operation within the Crescent City Harbor. The work will be conducted during daylight hours only for the remainder of the 2007 calendar year. The dredged material will be transported to the deposition sites through floating, submerged, and shore pipelines. Extreme caution should be exercised when passing the dredge and pipeline. If in doubt, vessels should contact the dredge for passing instructions. The dredge -Texas- (call sign WQX 715) will be monitoring channels 9 and 16. For more details or comments contact Richard Young at 707-464-6174, x24.

Chart 18603 LNM: 40/07

NORTHERN CALIFORNIA-DREDGING-OAKLAND

Dutra has commenced dredging operations at the Port of Oakland Berths 32, 33, and 60-63 until November 30, 2007. Operations will be 24 hours between the dredge sites and disposal sites Offshore SF-DODS and Oakland Middle Harbor. The dredge DB Beaver and tugs Heidi Brusco, Terri L. Brusco, Western Cougar, and Trojan will monitor VHF-FM Ch 13, 14, and 82. Mariners are advised to use extreme caution when transiting the area. For more details or comments, contact Steve Durham at 707-974-4385.

Charts: 18649 18650 18652 LNM: 14/07

NORTHERN CALIFORNIA-DREDGING-OAKLAND

Vortex will conduct maintenance dredging at the Port of Oakland berths 30,32,33, 60 and 63 from 1 August through November 2007. All equipment will monitor VHF-FM Ch 14 and 16. Operations will be 24 hours a day. For more details or comments contact Anthony Caramagna at 510-715-3556.

Chart 18650 LNM: 31/07

NORTHERN CALIFORNIA-DREDGING-OAKLAND HARBOR

Manson / Dutra Joint Venture has been contracted to dredge the Oakland Inner Harbor. Dredging will be conducted in the Inner Harbor from Buoy # 7 to the Inner Harbor Turning Basin and in the Outer Harbor, from Buoy #3 east to Buoy #11. Dredging in the Inner Harbor will be performed by the dredge -Njord- and the dredge -Paula Lee- starting as early as October 17 and shall be completed by December 31, 2007. All dredges will use and monitor Channel 14, 16 and 66. Mariners are advised to use extreme caution while transiting the dredge area. Mariners are also advised to use caution when transiting near the offloading site located in position 38-00.4N 122-25.8W, approximately five miles southeast of the former Hamilton Air Force Base runway. For more information contact 510-337-8846.

Chart 18650 LNM: 42/07

NORTHERN CALIFORNIA-DREDGING-OAKLAND OUTER HARBOR

Manson / Dutra Joint Venture has been contracted to dredge the Oakland Outer Harbor Channel. Dredges Njord, Valhalla, and the Beaver will carry out dredging operations twenty four hours a day seven days a week in the Outer Harbor starting as early as 1 Nov 2007. Completion of dredging in the Outer Harbor is estimated around 1 Jul 2008. The Offloading Facility, currently under construction, will be located at 38-00.3709 N, 122-25.8897 W, approximately 5 miles southeast of the former Hamilton Air Force Base runway in San Pablo Bay. All dredges will use and monitor Channel 14, 16 and 66. Mariners are advised to use extreme caution while transiting the dredge area as well as the offloading site. For more details or comments please contact 510-337-8846.

Charts: 18650 18652 LNM: 43/07

NORTHERN CALIFORNIA-DREDGING-SAN FRANCISCO

The Salt River Construction Company will commence dredging operations in the Oyster Point Marina from 24 September through November 2007. The vessels Barbara Ann, Brandy Bar, Chandler M and Irene Lauritezen will be Monitoring VHF-FM Ch 13, 14 and 78. mariners are advised to use caution when transiting the area. For more details or comments, contact Rick Mosely at 415-435-1024.

Chart 18651 LNM: 38/07

NORTHERN CALIFORNIA-DREDGING-SAN FRANCISCO

The Salt River Construction Company will commence dredging operations in the Aeolian Yacht Harbor from 24 September through November 2007. The vessels Barbara Ann and Brandy Bar will be Monitoring VHF-FM Ch 13, 14 and 78. mariners are advised to use caution when transiting the area. For more details or comments, contact Rick Mosely at 415-435-1024.

Chart 18649 LNM: 38/07

NORTHERN CALIFORNIA-DREDGING-SUISUN BAY

Dredging has commenced on the Suisun Bay Channel and New York Slough and will be completed by 2 November 2007. Dredging will be twenty

NORTHERN CALIFORNIA-DREDGING-SUISUN BAY

four (24) hours a day seven days a week. All Vessels and equipment will monitor VHF-FM Ch 13, 14, and 82. Mariners are advised to use caution and transit at a safe speed to minimize wake while transiting the dredge sites. Mariners urged to make passing arrangements. For more details or comments, contact Oriana Duranczyk at 415-259-7458.

Chart 18652 LNM: 38/07

NORTHERN CALIFORNIA-DRILLING OPERATIONS-SAN FRANSICO BAY

The R/V Quin Delta will be conducting drilling operations in the Newark slough/ Plummer-s Creek area, between 26 Oct and 8 Nov. Mariners are request to observe a 300 ft safety / no wake zone while passing. The Quin Delta will be monitoring channels 13, 14 and 73.

Charts: 18651 18652 LNM: 43/07

NORTHERN CALIFORNIA-MARINE EVENT-SAN FRANCISCO BAY

Alcatraz Challenge LLC will sponsor a swimming event involving 15 participants swimming from Alcatraz Island to Angel Island in San Francisco Bay from 0745 to 0845 on 04 November 2007. All mariners are advised to exercise caution when transiting this area. For more details or comments contact MST1 J. Castillo at 415-399-7440.

Chart 18650 LNM: 44/07

NORTHERN CALIFORNIA-OBSTRUCTION-TOMALES BAY

There is a 10 foot by 1 foot partially submerged metal pipe stuck in the sand in position: 38-14-21.000N, 122-59-09.600W. Mariners are advised to transit the area with caution.

Chart 18643 LNM: 31/06

NORTHERN CALIFORNIA-SAFETY ZONE-SAN FRANCISCO BAY

The United States Coast Guard has established a safety zone near Anchorage 9 and Hunters Point from 0800 to 1400 on 1, 8, and 15 Nov. 2007. Alameda County Sherriff's Office will be conducting training and all mariners are advised to exercise caution when transiting this area. The project-s sponsor will be monitoring CH 13 and 14 during the event. For more information contact ENS S. Richardson at 415-399-7436.

Chart 18651 LNM: 44/07

NORTHERN CALIFORNIA-SHOALING-BERKELEY MARINA-SAN FRANCISCO BAY

Shoaling has been reported in the vicinity of Berkeley Harbor Entrance, in the vicinity of Berkeley Breakwater Light 2 (LLNR-5450). Vessels have reported depths as shallow as 3 feet at MLLW. A chartlet of the area is included in the enclosures.

Chart 18653 LNM: 09/06

NORTHERN CALIFORNIA-SHOALING-SOUTHHAMPTON SHOAL-SAN FRANCISCO

Shoaling has been reported between Southampton Shoal Channel and Richmond Harbor Entrance Channel. A depth of 17 feet was reported in the vicinity of 37-54.630N, 122-25.010W. Mariners are advised to use caution when transiting the area.

Chart 18653 LNM: 05/07

NORTHERN CALIFORNIA-SUBMERGED VESSEL-SAN FRANCISCO

Partially submerged S/V with a black hull and a white mast in approximate position: 38-03-21.600N, 121-37-03.600W. IVO Franks Tract. For more details contact CG Station Rio Vista 707-374-6477.

Chart 18661 LNM: 37/07

NORTHERN CALIFORNIA-SUBMERGED WOODEN PILING-BODEGA AND TOMALES BAY

There is a three foot by three foot submerged wooden piling approximately 100 yards off Doran Park Beach in Position: 38-18-39.600N, 123-02-41.400W. Mariners are advised to use caution in the area.

Chart 18643 LNM: 31/06

NORTHERN CALIFORNIA-SUNKEN TUG-OAKLAND INNER HARBOR-Updated 4/24/2007

A tug has sunk in approximate position 37-46.25N, 122-14.26W, in the waters near Alameda Park Street Bridge. The tug has been marked with a yellow buoy marked "Danger" with a quick flashing yellow light and two danger buoys marking the bow and stern of the vessel. All mariners should transit the area with extreme caution.

Charts: 18649 18650 18652 LNM: 16/07

NORTHERN CALIFORNIA-SUNKEN VESSEL-NAPA RIVER

A vessel of unknown size has sunk in the Napa River navigational channel in position:
38-13-55N, 122-17-34W
Position is marked with a buoy and a quick flashing white light. The vessel is not visable above +5 MLLW.

Chart 18654 LNM: 35/07

NORTHERN CALIFORNIA-TOWING OPERATIONS-SAN PABLO BAY

Manson-Dutra Construction Co. will begin assembly of a Dredged Material Offload Facility in San Pablo Bay 5 miles offshore of and South East of the former Hamilton Air Force Base runway on 15 October 2007. The project will consist of twenty six 1,000 ft sections of steel pipe being towed from Rio Vista to the construction site. Each 1,000 ft section will be supported by pontoons, marked with flashing white lights and be towed by one tugboat and two assist vessels. Towing operations will take place from the western shoreline of the Sacramento River just upstream of the Rio Vista Bridge and proceed down the Sacramento River, Suisun Bay and San Pablo Bay to the Hamilton construction site. The tug Westar Bob will

NORTHERN CALIFORNIA-TOWING OPERATIONS-SAN PABLO BAY

monitor channels 13, 14 and 66 and requests overtaking vessels pass down the port side. Hours of operation will be 1900 to 0700 from 15 October to 1 November 2007. For more information contact the Dutra Group at 510-337-8846.

Charts: 18654 18656 18661 LNM: 41/07

NORTHERN CALIFORNIA-WATER INTAKE CONSTRUCTION-SACRAMENTO

Freeport Regional Water District in conjunction with Balfour Beatty Infrastructure will be building a Water Intake Structure near Freeport Bend in the Sacramento River. The structure, when complete, will show Fl W 4s lights in positions 38-28-01.980N, 121-3022.200W, and 38-28-21.6000N, 121-30-24.600W. During construction, these same lights will move out from shore to the above positions. This project is scheduled for completion through September 2009. For more details or comments, contact Freeport Public Outreach 916-420-8067.

Charts: 18652 18662 LNM: 25/07

SOUTHERN CALIFORNIA-BRIDGE-CERRITOS CHANNEL

HENRY FORD DRAWBRIDGE-The vertical clearance gauge on the west side of the drawbridge is missing.

Chart 18749 LNM: 18/07

SOUTHERN CALIFORNIA-BRIDGE-LOS ANGELES/LONG BEACH HARBOR

VINCENT THOMAS BRIDGE-Temporary scaffolding, installed 230 feet west of the center of the bridge until 9 November 2007, reduces vertical clearance by approximately 5 feet. Scaffolding will be lighted at night with red lights.

Chart 18751 LNM: 43/07

SOUTHERN CALIFORNIA-CAMP PENDLETON-Updated 1/23/2007

EXPEDITIONARY FIGHTING VEHICLE TESTING. The U.S. Marine Corps is testing the Expeditionary Fighting Vehicle (EFV) 24 HOURS A DAY through June 2008 off of Camp Pendleton, from the Oceanside Harbor entrance to San Mateo Point and to 25 NM off shore. There may be as many as (4) EFVs testing at the same time and as many as (4) 10 meter RHIBs and (1) MK-6 workboat supporting testing and in the vicinity of the EFVs. All vessels will have lighting in accordance with regulations. There may be times when spotlights and or strobe lights will be visible in the test area. All support vessels in the test team will be monitoring RADAR and VHF-FM Ch 81A. The Water Safety Officer will be monitoring VHF-FM CH 81A as well. For more details or comments contact the Operations Officer at 760-763-4428.

Chart 18740 LNM: 39/05

SOUTHERN CALIFORNIA-CONSTRUCTION-LONG BEACH-LOS ANGELES

Manson Construction will be conducting construction operations at Berth G-226 in Port of Long Beach. No anchors, crown cans or wires will be deployed. Operations will be from 27 November 2006 through 30 July 2008. The vessels DB Valhalla, DB Valkyrie and Jeffrey M. will monitor VHF-FM Ch. 13, 16 and 66. For more details or comments contact D/B Valhalla at 562-762-5424, or Jerry Gienger at 562-762-5404.

Chart 18751 LNM: 47/06

SOUTHERN CALIFORNIA-CONSTRUCTION-LOS ANGELES

The Los Angeles Deepening Project is currently being conducted in Southwest Slip near Los Angeles Pier 100. A submerged rock dike has been constructed from Pier 100 northwesterly into Southwest Slip and is being filled to +10 ft MLLW. All mariners are advised to remain clear of this area. For more details or comments contact BMC Ralph Williams at 310-732-2020.

Chart 18751 LNM: 39/05

SOUTHERN CALIFORNIA-CONSTRUCTION-LOS ANGELES-Updated 8/14/2006

Manson Construction will be conducting construction operations in the vicinity of the south side of Pier 400 in the Port of Los Angeles through December 2007. Three Coast Guard Lights have been established to mark the perimeter. Mariners requiring 8 ft or greater navigational draft must remain clear of this area. Several vessels will be on scene monitoring VHF-FM Ch 8, 13, 66, and 79A. For more details or comments contact Mike Ellis at 310-521-1300.

Chart 18751 LNM: 39/05

SOUTHERN CALIFORNIA-CONSTRUCTION-NEWPORT BEACH

Tetra Tech has commenced the replacement of a bulkhead on Lido Peninsula until 22 February 2008. For more details or comments contact Tracy Stofferahn at 949-929-7575.

Chart 18754 LNM: 37/07

SOUTHERN CALIFORNIA-CONSTRUCTION-PORT OF LONG BEACH-LOS ANGELES

Removal and replacement of a reinforced concrete abutment, removal and replacement of a structural steel pier approach ramp, removal and replacement of selected portions of a reinforced concrete pier, repairs to selected portions of a reinforced concrete pier, protection and temporary support of pier utilities, removal of portions of a timber fender system, installation of a pre-stressed concrete pile supported pre cast concrete floating fender backboard system, installation of foam filled floating fenders and incidental related work. Construction will continue through December 2007, the hours of operation will be Monday through Friday 0600 to 1700 each day, NO weekends. Pier T16 is located inside the West Basin of the Port of Long Beach. Most of the work will be done on and inside the footprint of the pier and shouldn't impact vessel traffic in the area. The work will include small boat work as well as periods where they will be bringing in a crane barge to drive piles. All of the work is planned to take place within the footprint of the Sea Launch vessels. Most of the work will be done from on top or below the pier structure. All mariners are urged to use caution when transiting the area. For more details or comments call Jeremiah Jilk from the John S. Meek Company at 310-830-6323. See enclosure section for charted work area.

Chart 18751 LNM: 48/05

SOUTHERN CALIFORNIA-CONSTRUCTION-SAN DIEGO BAY

Staite Engineering is installing fender piles from a waterside crane barge, commencing on the B Chevron Pier, Embarcadero Wharf Broadway Street Pier, Fish Harbor Pier, Crosby Pier, and Tenth Avenue Marine Terminal B through 28 Dec 07. The crane barge performing this work and all tug(s) towing the material and equipment barges to and from these sites work will monitor channel 16. For more details or comments contact Project Foreman, David Lobaugh at 619-233-0178 or Harbor Tug and Barge at 619-237-5468.

Chart 18773 LNM: 44/07

SOUTHERN CALIFORNIA-DREDGING-CONSTRUCTION-LOS ANGELES

The L.A. Deepening Constructors, Manson Construction and Connolly-Pacific Co., will be conducting construction operations including clam dredging and rock replacement at Pier 300 24 hours per day through December 2007 and dredging in the main channel working outbound. A rock dike perimeter to +9 ft MLLW will be constructed, followed by hydraulic fill operation to +15 ft MLLW. The D/B Long Beach, D/B Njord and the D/B Los Angeles, along with the assist vessels, will be on scene and monitoring VHF-FM CH 13, 16, 66, and 79A. A lighted warning buoy has been placed in position 33-44.30N, 118-14.92W. For more details or comments, contact John Molvar or Ken Feldhacker at 310-521-1300.

Chart 18751 LNM: 39/05

SOUTHERN CALIFORNIA-DREDGING-NEWPORT BAY-Updated 5/7/07

DD-M Crane & Rigging has commenced dredging the Upper Newport Bay area, from approximately the PCH Bridge to Hotdog Tern Island near Jamboree Rd. in position: 33-38-26.10N, 117-53-19.28W. DD-M is currently dredging in the vicinity of the Unit II Basin, and will continue northward into the ecological preserve, dredging the access channel, island channels and sediment basins. Dredging hours have been restricted to Monday through Saturday with exclusion of Federal Holidays. Dredging operations will be twenty-four hours a day for the six working days through October 2007. Clamshell dredge DB 3 will conduct dredging. Two Brusco tugs, the Cleo Brusco and the Roland Brusco will assist the dredge and tow scows through the Lower Bay to and from the Offshore and Nearshore disposal sites. All equipment will monitor VHF-FM CH 13, 14, 16, and 82. The names as well as the VHF-FM channel are posted on the side of each piece of equipment to ease communications. One of the scows will be intermittently moored in the Lower Bay adjacent to Harbor Island when passage under the PCH Bridge is not possible. Mariners are urged to transit at their slowest safe speed to minimize wake, and proceed with caution after passing arrangements have been made. Mariners are urged not to transit between the buoys marking the pipeline. For more details or comments contact Oriana Duranczyk at 415-259-7458.

Chart 18754 LNM: 18/06

SOUTHERN CALIFORNIA-DREDGING-VENTURA

Manson Construction Co. will be conducting dredging of the entrance channel, and sand traps at McGrath State Beach. The dredge H. R. Morris will begin on or about 01 Nov 2007 and continue for three months. Material will be transported through floating, submerged and shore pipeline to the disposal area south of the McGrath State Beach and the South Beach north of the Santa Clara River. Extreme caution and radio contact is requested when passing the dredge H.R. Morris. D/B Southman, dredge tender Cub, dredge tender Pup and survey boat Renegade will be assisting in operations. Radio frequencies 16 and 67 will be monitored. For more details or comments contact Frank Bechtolt at 562-762-5367 or the H.B. Morris at 562-762-5449.

Charts: 18720 18725 LNM: 43/07

SOUTHERN CALIFORNIA-LA DEEPING PROJECT-LOS ANGELES

Connolly Pacific Co. will continue work on the LA Deeping Project in the Port of Los Angeles Harbor Berth 306. The derrick barge Long Beach will be onsite from 20 September though November 2007. Buoys will be positioned for rock barges. The derrick barge Long Beach will monitor VHF-FM Ch 79A during working operations. For more details or comments, contact Ron Allard at 562-577-0814.

Chart 18751 LNM: 38/07

SOUTHERN CALIFORNIA-NAVIGATION HAZARD-SAN CLEMENTE ISLAND

A U. S. Navy mooring assembly consisting of four 59 inch orange spherical steel buoys with a Fl 4 W light has broken free from its anchor. See enclosure regarding mooring assembly. It was last seen at 33-19.7N 117-52.1W. It likely has an 800ft pendant that is trailing behind it which would cause significant propeller damage to a passing vessel. Mariners are advised to use caution when transiting this area. Report any sightings of this assembly to the nearest Coast Guard unit.

Charts: 18022 18763 LNM: 44/07

SOUTHERN CALIFORNIA-PIER REHABILITATION-SAN DIEGO-Updated 4/10/07

Reyes Construction will commence pier rehabilitation on the former Navy pier from 5 September 2006 to 26 December 2007. The work entails topside improvements to the pavement surface and the drainage system, structural concrete repairs to the underside beams and deck soffit and inserting some grout under the retaining wall that encircles the mole portion of the pier. There may be a need to employ a temporary boom and silt curtain slightly outboard of the pier during work activities. Steps will be taken to assure that it is not a hazard to navigation if need to temporarily employ one becomes necessary. For more details or comments, see enclosures for the charted work area and contacts.

Chart 18773 LNM: 35/06

SOUTHERN CALIFORNIA-RESEARCH BUOY DEPLOYED-SAN DIEGO

As part of an on-going research project with the Southern California Coastal Ocean Observing System (SCCOOS), SIO scientists have deployed a research buoy. This buoy will be in place through JUNE 2008 in position: 32-32-12.000N, 117-11-06.000W in 28 meters of water. The buoy is operated by Scripps Institution of Oceanography, Coastal Observing Research and Development Center. The buoy is a 3ft diameter yellow foam buoy with a radar reflector and FL Y 4s light. For more details or comments, contact William Middleton at 858-822-2813 or email billy@mpl.ucsd.edu.

Chart 18765 LNM: 18/07

SOUTHERN CALIFORNIA-RESEARCH BUOY DEPLOYED-SAN DIEGO TO SANTA ROSA ISLAND-DEL MAR-Updated 7/9/07

SOUTHERN CALIFORNIA-RESEARCH BUOY DEPLOYED-SAN DIEGO TO SANTA ROSA ISLAND-DEL MAR-Updated 7/9/07

A Waverider buoy has been deployed 2.5 nautical miles, bearing 310 degrees true from Del Mar, in position: 32-56.1N, 117-19.1W, in 56 fathoms of water. The buoy will be deployed until 30 Dec 2007. The buoy is operated by Scripps Institution of Oceanography. The buoy is a 2.5 meter diameter yellow buoy with a 3 meter tower, showing a light characteristic of Flashing Yellow 4s. For more information contact Taylor Semingson at 858-945-7725.

Charts: 18720 18740 LNM: 08/06

SOUTHERN CALIFORNIA-RESEARCH VESSEL-SAN CLEMENTE ISLAND

The research platform FLIP will be moored 13 miles northwest of San Clemente Island at position 33-10N, 118-48W during the period 31 October to 29 November 2007. While moored, FLIP will have a draft of 300 feet and will have 55 feet of structure above the waterline. Scientific equipment will be deployed from FLIP. FLIP will guard bridge to bridge channel 16 at all times. Request all vessels remain well clear of the research platform FLIP. For more details or comments contact Captain William A. Gaines at 858-534-1797, or e-mail at wgaines@ucsd.edu.

Chart 18022 LNM: 43/07

SOUTHERN CALIFORNIA-SHOALING-ANAHEIM BAY, SEAL BEACH

A hydrographic survey of Seal Beach was conducted by the Army Corps of Engineers in Jul 2007. There is indication of shoaling on the eastern side of the channel from the pier head to approx 100 yds out and up to the Line of Demarcation. It is recommended that all ships entering Seal Beach stay approx 50-75 ft left of the channel centerline until through the Line of Demarcation. See enclosure. For more details or comments, contact QMC(SW) Dan Kenley at 619-556-1442

Chart 18746 LNM: 40/07

SOUTHERN CALIFORNIA-SHOALING-VENTURA HARBOR ENTRANCE

The Coast Guard has placed Buoy 8 (LLNR-3715) to mark best water at the edge of the shoaling in 28ft of water. This marking reduces the channel by 40-45% of its width. The shoaling is located on the south breakwater in the vicinity of LT 6 and extending in a NW direction into the channel. The aids in this area will be moved to mark best water. For more details or comments, contact BMCS David Bullard at 310-732-7312.

Chart 18725 LNM: 51/06

SOUTHERN CALIFORNIA-UNDERSEA TESTING-TANNER BANKS TO SAN NICOLAS ISLAND

The U.S. Navy is testing undersea equipment and an associated telemetry buoy 24 HOURS A DAY from 6 Nov-20 Nov 07 in the vicinity of Tanner Banks and San Nicolas Island. There may be as many as 5 surface vessels including USNS, USCG, USN 11 meter RHIBs, Research and Motor vessels operating in the area at one time. All vessels will have lighting in accordance with regulations. All vessels with the exception of the RHIBs will be monitoring RADAR and all vessels will monitor VHF-FM Ch 82. An ocean buoy, associated anchor and tether will be temporarily installed near the charted submerged obstruction 32-54N and 119-22W. All vessels not in direct support of the undersea system test are strongly encouraged to remain clear of this buoy hazard area. For more details or comments contact the ADS Liaison at 619-524-7639.

Chart 18740 LNM: 44/07

SECTION VIII - LIGHT LIST CORRECTIONS

An Asterisk *, indicates the column in which a correction has been made to new information

(1) No.	(2) Name and Location	(3) Position	(4) Characteristic	(5) Height	(6) Range	(7) Structure	(8) Remarks	
285	*Cypress Point Lighted Gong Buoy 6*	36-35-02.847N 121-59-06.766W	Fl R 2.5s		4	Red.		44/07
4495	* SF WATERFRONT PIER 45 W LT	37-48-42.000N 122-25-12.000W	F R	22		Gray building.	Private aid. *	44/07

PUBLICATION CORRECTIONS

NOS PUBLICATION

The list of latest editions of Nautical Charts and Miscellaneous Maps, published by the National Ocean Service, is available for issue. It may be obtained free by mail from the National Aeronautical Charting Office, AVN-530, Federal Aviation Administration, 6303 Ivy Lane, Suite 400, Greenbelt MD, 20770-1479, by telephone at 1-800-638-8972 or from your local authorized nautical chart sales agent. This is a quarterly publication listing the most recent editions of nautical charts, miscellaneous maps and publications relating to navigation, weather, etc. with brief descriptions and up-to-date prices for most of the publications listed. Much of this information may also be obtained online at: http://chartmaker.ncd.noaa.gov/mcd/dole.htm.

ENCLOSURES

AUTOMATIC IDENTIFICATION SYSTEM (AIS) FOR COMMERCIAL VESSELS

AISinformation.pdf

The above link will access the internet web pages and hyper links related to AIS in the VTS San Francisco Area.

LNM: 49/05

NORTHERN CALIFORNIA-BERKELEY MARINA-SAN FRANCISCO BAY

Berkeley_Shoaling.pdf

See link above for chartlet of shoaled area. Number of pages 1

LNM: 09/06

REPORT OF DELAY AT DRAWBRIDGE

DelayRept0207.pdf

Use link above to Report a Delay at a Drawbridge

LNM: 06/07

SOUTHERN CALIFORNIA-SHOALING-ANAHEIM BAY, SEAL BEACH

Anahiem Bay.pdf

See link above for shoaled area. Number of pages 1

Chart 18746 LNM: 40/07

SOUTHERN CALIFORNIA-Geophysical Survey-Santa Rosa Island

Geophysical Survey.pdf

See link above for Geophysical Survey Permit. Number of pages 2.

LNM: 31/07

SOUTHERN CALIFORNIA-NAVIGATION HAZARD-SAN CLEMENTE ISLAND

IMGP1019.pdf

See link above for picture of mooring assembly. Number of pages 1

Charts: 18022 18763 LNM: 44/07

THE LOCAL NOTICE TO MARINERS IS AVAILABLE ON THE WORLD WIDE WEB AT WWW.NAVCEN.USCG.GOV/LNM/D11/.

D. K. Steadman, LCDR
U.S. Coast Guard
Chief, Waterways Management Branch

Exhibit I

U.S. Department
of Homeland Security
United States
Coast Guard

LOCAL NOTICE TO MARINERS

District: 11 Week: 32/08

SEND CORRESPONDENCE TO:
COMMANDER
DISTRICT ELEVEN (DPW)
COAST GUARD ISLAND BUILDING 50-2
ALAMEDA, CA 94501-5100

BROADCAST NOTICE TO MARINERS - Information concerning aids to navigation and waterway management promulgated by BNM 0410-08 to BNM 0425-08 has been incorporated in this notice if still significant.

SECTION I - SPECIAL NOTICES

This section contains information of special concern to the Mariner.

SUBMITTING INFORMATION FOR PUBLICATION IN THE LOCAL NOTICE TO MARINERS

A complete set of guidelines with examples and contact information can be found on our website at http://www.uscg.mil/D11/DP/LnmRequest.asp or call BMC Jay Field at 510-437-2969 or e-mail D11LNM@uscg.mil.

BRIDGE INFORMATION-DISCREPANCIES AND CORRECTIONS

For bridge related issues during normal working hours Monday through Friday, contact the Eleventh Coast Guard District Bridge Section, Coast Guard Island, Building 50-2, Alameda, CA 94501-5100, telephone: 510-437-3516 Office; 510-219-4366 Cell. For emergencies or discrepancies during nights, weekends and holidays, immediately notify the nearest Coast Guard Sector Command via VHF-FM CH 16 or via telephone: San Diego & Colorado River 619-295-3121, Los Angeles 310-521-3800, San Francisco 415-399-3547, Eureka 707-839-6113. Flotsam and drift may have accumulated on and near bridge piers and abutments and mariners should approach all bridges with caution.
To REPORT A DELAY AT A DRAWBRIDGE see enclosure at the end of this document.

DGPS-Update 5/19/08

For information regarding the DGPS system contact the Petaluma Control Center at 707-765-7612, or http://www.navcen.uscg.gov. Mariners are encouraged to report all GPS, DGPS, or AIS problems or outages to website: http://www.navcen.uscg, or email: nisws@navcen.uscg.gov, or the USCG Navigation center at 703-313-5900.

LORAN-C

For information regarding the Loran-C System, contact the Coordinator of Chain Operations West Coast at 707-765-7518. Users may address inquiries to the following U.S. Loran-C Chain Operations Control Officers: Western Pacific at 707-765-7598, West Coast at 707-765-7595, and South Central at 703-313-5873. Current Loran-C Status is available 24 hrs per day through the Internet at: http://www.navcen.uscg.gov.

VANDENBERG DANGER ZONES

For information regarding the current Vandenberg Danger Zones status updates contact 800-648-3019 or 805-606-8825.
Charts: 18720 18740

CALIFORNIA SEACOAST-WHALES-POINT CONCEPTION TO POINT DUME

Vessels transiting the Santa Barbara Channel should be aware of the potential of Blue Whales feeding in the channel and the shipping lanes between the months of June through mid November. Mariners should exercise caution when traveling through the channel and in and out of Los Angeles and Long Beach harbors, as blue whales maybe distributed throughout the area. Blue whales are an endangered species protected under Federal law. Please report any collisions with whales or any observed injured or dead whales to NOAA at 562-980-4017 or to the U.S. Coast Guard.

Chart 18740 LNM: 26/08

CHART CORRECTIONS-Updated 06/30/08

For a limited period beginning June 15, 2008, RNCs will not be updated for either Notices to Mariners or for new editions of the nautical charts. This temporary interruption of service is due to a change in RNC production systems. Full RNC service will resume when reliable production is restored. In the interim, continuously updated NOAA Print on Demand charts (www.OceanGrafix.com <http://www.oceangrafix.com/), traditional printed charts, and free Electronic Navigational Charts and updates (http://nauticalcharts.noaa.gov/mcd/enc/index.htm) will continue to be available.

LNM: 24/08

TRANSPORTATION WORKER IDENTIFICATION CREDENTIAL (TWIC)

TWICs are tamper-resistant biometric credentials that will be issued to ALL USCG credentialed Merchant Mariners, as well as workers who require unescorted access to secure areas of ports, vessels, and outer continental shelf facilities. By April 15, 2009, all USCG credentialed mariners will be required to hold a TWIC in order for their license, Merchant Mariner Document (MMD), Certificate of Registry (COR), or Standards of Training, Certification, and Watchkeeping (STCW) endorsement to remain valid. Failure to obtain a TWIC may result in suspension or revocation of a mariner-s credential under 46 U.S.C. 7702 and 7703. For more details see Enclosures section of this Local Notice to Mariners.

LNM: 32/08

SECTION II - DISCREPANCIES

This section lists all reported and corrected discrepancies related to Aids to Navigation in this edition. A discrepancy is a change in the status of an aid to navigation that differs from what is published or charted.

DISCREPANCIES (FEDERAL AIDS)

LLNR	Aid Name	Status	Chart No.	BNM Ref.	LNM St	LNM End
380	Noonday Rock Lighted Bell Buoy 28	MISSING/TRLB	18645	0381-08	30/08	
385	Point Reyes Light	REDUCED INT	18647	0319-08	24/08	
1567	San Diego Bay Submerged Jetty Light E	TRLB/REDUCED INT	18773	0028/06	02/06	
6385	**Suisun Bay Channel Lighted Buoy 9**	**REDUCED INT**	**18657**	**422-08**	**32/08**	
7105	Stockton Channel Range H Rear Light	REDUCED INT	18663	0343-07	33/07	
7240	Sacramento River Deep Water Ship Channel Light 16	TRLB/DBN DEST	18660	0367-017	33/07	
7845	Bodega Harbor Channel Range C Front Light 14	TRLB/DBN DEST	18643	0298-07	27/07	
8250	Samoa Channel Light 3	TRLB/DBN DEST	18622	0174-08	13/08	

DISCREPANCIES (FEDERAL AIDS) CORRECTED

LLNR	Aid Name	Status	Chart No.	BNM Ref.	LNM St	LNM End
170	Point Vicente Light	WATCHING PROPERLY	18746		32/08	32/08
3108	Los Angeles Approach Channel Lighted Buoy 5	RELIGHTED	18751		31/08	32/08
3875	Morro Bay Channel Lighted Buoy 8	WATCHING PROPERLY	18703		32/08	32/08
6785	San Joaquin River Lighted Buoy 30	RELIGHTED	18660	0416-08	32/08	32/08
7845	Bodega Harbor Channel Range C Front Light 14	WATCHING PROPERLY	18643		28/08	32/08

DISCREPANCIES (PRIVATE AIDS)

LLNR	Aid Name	Status	Chart No.	BNM Ref.	LNM St	LNM End
4262	**Golden Gate Bridge Racon G**	**RAC IMCH**	**18650**	**423-08**	**32/08**	
4426	**San Francisco-Oakland Bay Bridge Racon N**	**RAC INOP**	**18650**	**0411/08**	**32/08**	

DISCREPANCIES (PRIVATE AIDS) CORRECTED

LLNR	Aid Name	Status	Chart No.	BNM Ref.	LNM St	LNM End
7331	Rio Vista Bridge Racon T	WATCHING PROPERLY			31/08	32/08

PLATFORM DISCREPANCIES

Name	Status	Position	BNM Ref.	LNM St	LNM End

None

PLATFORM DISCREPANCIES CORRECTED

Name	Status	Position	BNM Ref.	LNM St	LNM End

None

SECTION III - TEMPORARY CHANGES and TEMPORARY CHANGES CORRECTED

This section contains temporary changes and corrections to Aids to Navigation for this edition. When charted aids are temporarily relocated for dredging, testing, evaluation, or marking an obstruction, a temporary correction shall be listed in Section IV giving the new position.

TEMPORARY CHANGES

LLNR	Aid Name	Status	Chart No.	BNM Ref.	LNM St	LNM End
3855	Morro Bay Channel Lighted Buoy 4	TRLB	18703	0384-08	30/08	
3856	Morro Bay Channel Lighted Buoy 4A	TRLB	18703	0384-08	30/08	
3865	Morro Bay Channel Lighted Buoy 6	TRLB	18703	0384-08	30/08	
3875	Morro Bay Channel Lighted Buoy 8	TRLB	18703	0384-08	30/08	
4655	Oakland Outer Harbor Lighted Buoy 9	RELOCATED FOR DREDGING	18650	0252-08	18/08	
8135	Humboldt Bay Entrance Bell Buoy 2	RELOCATED FOR DREDGING	18622	0153-08	12/08	
8175	Humboldt Bay Lighted Bell Buoy 5	RELOCATED FOR DREDGING	18622	0154-08	12/08	

TEMPORARY CHANGES CORRECTED

LLNR	Aid Name	Status	Chart No.	BNM Ref.	LNM St	LNM End

None

PLATFORM TEMPORARY CHANGES

Name	Status	Position	BNM Ref.	LNM St	LNM End

None

PLATFORM TEMPORARY CHANGES CORRECTED

Name	Status	Position	BNM Ref.	LNM St	LNM End

None

SECTION IV - CHART CORRECTIONS

. This section contains corrections to federally and privately maintained Aids to Navigation, as w ell as NOS corrections.

This section contains corrective actions affecting chart(s). Corrections appear numerically by chart number, and pertain to that chart only. It is up to the mariner to decide w hich chart(s) are to be corrected. The follow ing example explains individual elements of a typical chart correction._

Chart Number	Chart Edition	Edition Date	Last Local Notice to Mariners	Horizontal Datum Reference	Source of Correction	Current Local Notice to Mariners
12327	91st Ed.	19-APR-97	Last LNM: 26/97	NAD 83		27/97

Chart Title: NY-NJ-NEW YORK HARBOR - RARITAN RIVER

Main Panel 2245 NEW YORK HARBOR CGD01

(Temp) ADD NATIONAL DOCK CHANNEL BUOY 3 at 40-41-09.001N 074-02-48.001W

Green can

Corrective Action — Object of Corrective Action — Position

(Temp) indicates that the chart correction action is temporary in nature. Courses and bearings are given in degrees clockw ise from 000 true.
Bearings of light sectors are tow ard the light from seaw ard. The nominal range of lights is expressed in nautical miles (NM) unless otherw ise noted.

18649 65th Ed. 01-JUL-06 Last LNM: 30/08 NAD 83 32/08

ChartTitle: **Entrance to San Francisco Bay**

Main Panel 1823 ENTRANCE TO SAN FRANCISCO BAY. Page/Side: N/A

DELETE	Delete Oakland Inner Harbor Lighted Buoy #5 (LLNR 4665).	CGD11 37-48-05.692N	122-20-20.580W
DELETE	Delete San Francisco Bay North Channel Lighted Wreck Buoy 9A	CGD11 37-53-45.539N	122-27-09.861W

18650 55th Ed. 01-DEC-07 Last LNM: 30/08 NAD 83 32/08

ChartTitle: **San Francisco Bay Candlestick Point to Angel Island**

Main Panel 1824 SAN FRANCISCO BAY CANDLESTICK POINT TO ANGEL ISLAND. Page/Side: N/A

DELETE	Delete Oakland Inner Harbor Lighted Buoy #5 (LLNR 4665).	CGD11 37-48-05.692N	122-20-20.580W

18652 34th Ed. 01-SEP-07 Last LNM: 30/08 NAD 83 32/08

ChartTitle: **FOLIO SMALL CRAFT CHART San Francisco Bay to Antioch**

Main Panel 1833 SAN FRANCISCO BAY TO SAN PABLO BAY. Page/Side: C

DELETE	Delete Oakland Inner Harbor Lighted Buoy #5 (LLNR 4665).	CGD11 37-48-05.692N	122-20-20.580W

18653 10th Ed. 01-JUL-05 Last LNM: 30/08 NAD 83 32/08

ChartTitle: **San Francisco Bay-Angel Island to Point San Pedro**

Main Panel 1939 SAN FRANCISCO BAY ANGEL ISLAND TO POINT SAN PEDRO. Page/Side: N/A

DELETE	Delete San Francisco Bay North Channel Lighted Wreck Buoy 9A	CGD11 37-53-45.539N	122-27-09.861W

SECTION V - ADVANCE NOTICES

This section contains advance notice of approved projects, changes to aids to navigation, or upcoming temporary changes such as dredging, etc. Mariners are advised to use caution while transiting these areas.

SUMMARY OF ADVANCED APPROVED PROJECTS

Approved Project(s)	Project Date	Ref. LNM
None		

Advance Notice(s)

NORTHERN CALIFORNIA-PT ARENA LT (LLNR 420)

Due to upcoming renovation work at Pt Arena LT (LLNR 420) the Coast Guard anticipates removing the current lighting system and replacing it with a temporary light of reduced intensity. The temporary light will be in service beginning 18 August and will remain in service for approximately 30 days. Upon completion of the project the existing lighting system will be placed back into service. For more details or comments contact LTJG Nathaniel Ross at 510-437-2982 or Nathaniel.R.Ross@uscg.mil

Chart 18620 LNM: 32/08

SECTION VI - PROPOSED CHANGES

Periodically, the Coast Guard evaluates its system of aids to navigation to determine whether the conditions for which the aids to navigation were established have changed. When changes occur, the feasibility of improving, relocating, replacing, or discontinuing aids are considered. This section contains notice(s) of non-approved, proposed projects open for comment. SPECIAL NOTE: Mariners are requested to respond in writing to the District office unless otherwise noted (see banner page for address).

PROPOSED WATERWAY PROJECTS OPEN FOR PUBLIC COMMENT

Proposed Project(s)	Closing	Docket No.	Ref. LNM
None			

Proposed Change Notice(s)

NORTHERN CALIFORNIA - POINT REYES LIGHT (LLNR 385)

The Coast Guard intends to change the equipment at Point Reyes Light (LLNR 385), which will reduce its effective intensity, resulting in a decrease in the aid's nominal range from 24nm to 20nm. For more details or comments contact 510-437-2982 or Nathaniel.R.Ross@uscg.mil before 26 August 2008.

Charts: 530 18007 18640 18680 LNM: 30/08

SECTION VII - GENERAL

This section contains information of general concern to the Mariners. Mariners are advised to use caution while transiting these areas.

ARIZONA-CALIFORNIA-NEVADA-LORAN-C OPERATIONS-Updated 7/8/2008

LORAN Stations Las Cruces, NM (9610-X); and Middletown, CA, (9940-X) will be continuously on-air testing the LORAN DATA CHANNEL (LDC) until further notice. LORAN Station George, WA (5990-Y) is testing 0800-1500 (local), Monday through Friday until further notice. Users should not experience any tracking errors or service interference and will be notified when the testing is complete. To report a degradation in LORAN service contact 707-765-7598 or www.navcen.uscg.gov. For more details or comment contact LT Good at 707-765-7582.

LNM: 42/07

NEW MEXICO-GPS TESTING-WHITE SANDS MISSLE RANGE

The GPS navigation signal may be unreliable from 1 Apr 2008 through 31 Mar 2009 due to interference testing on GPS frequencies used in shipboard navigation and handheld systems. Electronic systems that rely on GPS, such as E-911, AIS and DSC, may be affected within a 153nm radius of position 33-01-07.000N, 106-17-26.000W. During this period GPS users are encouraged to report any service outages that they may experience during this testing by calling 703-313-5900 or by using the GPS Report a Problem worksheet at WWW.NAVCEN.USCG.GOV.

LNM: 15/08

NORTHERN CALIFORNIA-BRIDGE-GRANT LINE CANAL Updated 7/23/2008

The Tracy Blvd Drawbridge is secured in the closed-to-navigation position due to vandalism. Repairs are in progress.

Chart 18661 LNM: 33/07

NORTHERN CALIFORNIA-BRIDGE-OAKLAND INNER HARBOR

FRUITVALE AVENUE HIGHWAY DRAWBRIDGE - The fendering is damaged or missing from the north east side of the channel span and may not provide adequate protection for the bridge. Mariners are requested to transit the drawspan with caution and avoid contact with the bridge.

Chart 18649 LNM: 24/08

NORTHERN CALIFORNIA-BRIDGE-SACRAMENTO RIVER ELKHORN FERRY I-5 HIGHWAY BRIDGE

A construction barge, adjacent to bridge piers through 22 Aug 2008, will reduce horizontal clearance for navigation by 70 feet. The barge is lighted at night with red lights. Mariners may contact the tug/barge MUDCAT, via VHF-FM CH 13/14/16, to make passing arrangements.

Chart 18664 LNM: 31/08

NORTHERN CALIFORNIA-BRIDGE-SAN FRANCISCO BAY-Updated 6/2/2008

SAN FRANCISCO-OAKLAND BAY BRIDGE REPLACEMENT-EAST OF YBI: Mariners are advised to avoid the construction area by using the main navigational channel west of YBI. Mariners transiting the area should proceed with caution to avoid creating unstable conditions for on-site workers. Mariners may contact the Dutra/Taylor tug or American Bridge/FLUOR tug via VHF-FM Ch 16, or by telephone at 925-595-3289 (Dutra), 510-759-1325 (American Bridge/FLUOR), to determine conditions at the bridge. The green center span lights have been temporarily extinguished in the three spans east of the main channel span. A crane barge and two material barges are anchored approximately 483 yds ENE of the Yerba Buena Island shoreline at pier E-2, reducing horizontal clearance by approximately 210 ft. Anchor lines extend approximately 1500 ft north and south of the barges, anchor buoys are lighted at night with quick flashing white lights. A crane barge and material barge are anchored approximately 85 yds ENE of the Yerba Buena Island (YBI) shoreline at pier T-1, reducing horizontal clearance by approximately 110 ft. Anchor lines extend approximately 1500 ft north and south of the barges, anchor buoys are lighted at night with quick flashing white lights. Barges are lighted at night with steady burning red lights.

Chart 18650 LNM: 50/05

NORTHERN CALIFORNIA-BRIDGE-SAN JOAQUIN RIVER

I-5 Highway Bridge Widening project at Mossdale, CA. A temporary trestle has been installed from the south bank to within 40 feet of the north bank, for the bridge widening project, at the I-5 dual bridges. The trestle allows at least 40 feet horizontal clearance for vessels to pass between the bank and the north end of the trestle. The greatest clearance should be present during high tides. The bridge widening project will be in progress through June 2009. The temp trestle will be removed as soon as possible, when no longer required for the construction work.

Chart 18661 LNM: 30/07

NORTHERN CALIFORNIA-BRIDGE-TEN MILE RIVER-NORTH OF FT BRAGG Updated 01/28/08

CA RTE 1 HWY BRIDGE REPLACEMENT AND TEMP TRESTLE THROUGH March 2009. The temp trestle will be in place until completion of the replacement bridge, presently scheduled for 1 March 2009.

Chart 18620 LNM: 25/07

NORTHERN CALIFORNIA-DREDGING- SAN FRANCISCO

The Dutra Group will commence dredging operations on or about the 20 Jul 2008 to 31 Aug 2008 operating 24 hours a day, at Islais Creek and piers 80, 92 in the vicinity of Islais Creek with disposal at SF-11 Alcatraz open water disposal site. DB 24, Tug TERRI L BRUSCO and TROJAN will monitor channel 13, 14, and 82. All mariners are requested to use caution while transiting the dredge area. For more details and comments contact Oriana Duranczyk at 415-254-4443

Chart 18650 LNM: 29/08

NORTHERN CALIFORNIA-DREDGING-PITTSBURG

Cooper Crane & Rigging will be conducting maintenance dredging in the vicinity of the USS POSCO at Pittsburg from 11 Aug through 12 Sep 2008.

NORTHERN CALIFORNIA-DREDGING-PITTSBURG

The tugs HAYDEN BAY and POWER PUSHER will be on site and monitoring VHF -FM ch. 13 and 14. Mariners are advised to use caution when transiting this area. For more details or comments contact Cooper Crane & Rigging at 415-892-2778.

Chart 18657 LNM: 32/08

NORTHERN CALIFORNIA-DREDGING-RICHMOND

Salt River Construction will commence dredging operations in the Richmond Yacht Club (37-55-30N, 122-22-10W) on 14 July 2008 until 30 November 2008. The dredge BARBARA ANN and the tug IRENE LAURITZEN will monitor VHF-FM channels 13, 14, and 78. Mariners are advised to use caution when transiting this area. For more details or comments contact Rick Moseley at 415-435-1024.

Chart 18649 LNM: 28/08

NORTHERN CALIFORNIA-DREDGING-SAN PABLO BAY-Updated 04/22/2008

Manson/Dutra has commenced with a dredging project located near the San Pablo Strait in the area bounded by the following coordinates:
38-00-22.740N, 122-25-53.382W
38-01-15.354N, 122-27-03.978W
38-00-22.254N, 122-25-53.382W.
The dredge project will continue through 31 December 2009. All dredge vessels will monitor VHF FM Ch 13 and 14. Mariners are advised to use catuion and that this area may contain white mooring buoys with a blue horizontal band and a flashing 4 sec white light. For more details or comments contact Eric McMann at 510-774-8396 or VHF-FM Ch 13 and 16.

Charts: 18652 18653 18654 18655 LNM: 48/07

NORTHERN CALIFORNIA-MARINE EVENT-SAN FRANCISCO

Water World Swims will sponsor swimming events from Alcatraz Island to Aquatic Park at the following times:
Times
1000-1130 12 August 2008 30 participants
0630-0730 16 August 2008 12 participants
All mariners are advised to exercise caution when transiting this area. For more details or comments contact MST1 J. Castillo at 415-399-7440.

Chart 18650 LNM: 32/08

NORTHERN CALIFORNIA-MARINE EVENT-SAN FRANCISCO

The South End Rowing Club will sponsor a swimming event involving 50 participants from the south end to the north end of the Golden Gate Bridge from 0900 to 1000 on 10 August 2008. All mariners are advised to exercise caution when transiting this area. For more details or comments contact MST1 J. Castillo at 415-399-7440.

Chart 18650 LNM: 32/08

NORTHERN CALIFORNIA-MARINE EVENT-SAN FRANCISCO

Alcatraz Challenge, LLC will sponsor swimming events from Alcatraz Island to Aquatic Park at the following times:
Times
0630-0730 08 August 2008 05 participants
0800-0900 09 August 2008 05 participants
All mariners are advised to exercise caution when transiting this area. For more details or comments contact MST1 J. Castillo at 415-399-7440.

Chart 18650 LNM: 32/08

NORTHERN CALIFORNIA-NOAA MOORINGS-POINT REYES

NOAA Fisheries has placed 15 research moorings starting from Point Reyes and extending offshore for 7NM. The area is defined by the following coordinates:
38-02-00N 123-00-00W
38-02-00N 123-09-00W
38-30-00W 123-09-00W
38-30-00N 123-00-00W.
Each mooring consists of a anchor, tether, and floatation collar with receiver 25 ft off the bottom which may entangle lines or nets. Mariners are advised to transit the area with caution. For more details or comment contact Bruce MacFarlane at 831-420-3939.

Chart 18640 LNM: 30/08

NORTHERN CALIFORNIA-SHOALING-BERKELEY MARINA-SAN FRANCISCO BAY-Updated 12/08/2007

Shoaling has been reported at Berkeley Harbor Entrance, in the vicinity of Light 2 (LLNR-5450). Vessels have reported depths as shallow as 3 feet at MLLW. A chartlet of the area is included in the Enclosures. An additional survey and potential dredge project are being considered. For more details contact the Berkeley Harbor Master at 510-981-6740.

Chart 18653 LNM: 09/06

NORTHERN CALIFORNIA-SHOALING-CRESCENT CITY

As of May 2008, shoaling has been noted for the Crescent City Outer Entrance Channel to a minimum of 14 feet at mean low water and a minimum of nine feet in the Inner Harbor Basin. The Citizen Dock Entrance channel has areas of less than five feet. Conditions may change without notification. All mariners are advised to proceed using due caution for the current shoaling, tidal conditions, wave action and their draft requirements. See Enclosures. For more details or comment contact the Crescent City Harbor Master at 707-464-6174 ext.22

Chart 18603 LNM: 23/08

NORTHERN CALIFORNIA-SHOALING-SAN FRANCISCO

Shoaling has been reported between Southampton Shoal Channel and Richmond Harbor Entrance Channel. A depth of 17 feet was reported in the vicinity of 37-54.630N, 122-25.010W. Mariners are advised to use caution when transiting the area.

Chart 18653 LNM: 05/07

NORTHERN CALIFORNIA-SURVEY OPERATIONS-SUISUN BAY

Fugro West will be conducting pipeline surveys from July 29 through August 8, in the vicinity of 38-03-00N, 121-56-20W. The M/V JULIE ANN will be on the scene monitoring VHF-FM CH-16 & 14. Mariners are advised to use caution when transiting the area. For more details or comments contact Jim Grant at 510-267-4426.

Chart 18656 LNM: 31/08

NORTHERN CALIFORNIA-TEMPORARY BUOYS-MORRO BAY

The Coast Guard has temporarily replaced the following buoys:
MORRO BAY LB 4 (LLNR 3855) 35-21-45N, 120-52-02W
MORRO BAY LB 4A (LLNR 3856) 35-21-56N, 120-51-57W
MORRO BAY LB 6 (LLNR 3865) 35-22-05N, 120-51-50W
MORRO BAY LB 8 (LLNR 3875) 35-22-14N, 120-51-38W.
The Temporary Replacement Lighted Buoys (TRLB) are approximately 2.5 feet in diameter and height with LED lanterns. Due to frequently changing conditions, mariners are reminded that these buoys maybe moved to mark best water without notification. For more details or comment contact LT Smoak at 510-437-2982.

Chart 18703 LNM: 30/08

SOUTHERN CALIFORNIA - CAMP PENDLETON- MILITARY EXERCISE

The US Navy will be conducting exercises in the vicinity of Camp Pendleton, Ca between 25 June and 12 Aug 2008 in an area bound by the following coordinates:
033-16-30 N, 117-30-49 W
033-15-03 N, 117-28-52 W
033-17-00 N, 117-30-30 W
033-15-46 N, 117-29-31 W
Mariners are advised to say clear of this area. For more details or comment contact (619)-318-9446.

LNM: 26/08

SOUTHERN CALIFORNIA-CABLE-LAYING- PT LOMA, SAN DIEGO

The US Navy will be conducting cable deployment and recovery operations 30 Jul to 7 Aug 2008, 5 NM west northwest of Pt Loma light. ACOUSTIC EXPLORER will be restricted in its ability to maneuver during cable deployment and retrieval and will monitor channels 12, 13 and 16. Mariners are requested to avoid by 500 ft due to attached cables. For more details or comments contact Mark Gillcrist at 619-553-1602 or 619-203-1348.

Chart 18765 LNM: 31/08

SOUTHERN CALIFORNIA-CONSTRUCTION-CORONADO

Marathon Construction Co. will be conducting repair work between Piers 9 and 17 in the Naval Amphibious Base, Coronado, CA from 21 January 2008 to 11 October 2008. The Manitowoc and Linkbelt barges will be anchored adjacent to this area on a 4 point mooring system with anchor wires and crown buoys. Operations will be between 0500 and 2000 daily. Marathon vessels will monitor VHF-FM channel 16. For more details or comments contact Timothy Meyer at 619-843-8975

Chart 18773 LNM: 04/08

SOUTHERN CALIFORNIA-CONSTRUCTION-LOS ANGELES

Connolly-Pacific Co. is conducting a dock replacement project on berth 261-267 in the Port of Los Angeles until December 2008. The barge CP-41 will be monitoring VHF-FM Ch 79A. For more details or comments contact Earl Newman at 562-437-2831.

Chart 18751 LNM: 02/08

SOUTHERN CALIFORNIA-CONSTRUCTION-NORTH ISLAND

R. E. Staite will be repairing the quay wall on North Island from 15 June 2008 until 31 December 2008 at the following coordinates: 32-42-19N, 117-11-11W. The dredged sediments will be will be transported by dump scow to disposal area LA-5 at 32-36-50N, 117-20-40W. DB PALOMAR and tug FEATHER RIVER will be monitoring VHF-FM ch. 16. For more details or comments contact John St. Clair at 619-520-8557 or 619-303-5173.

Chart 18773 LNM: 26/08

SOUTHERN CALIFORNIA-CONSTRUCTION-SAN CLEMENTE, CA

Connelly-Pacific Co. is conducting construction operations from 9 June 2008 until 30 September 2008 in an area bounded by the following coordinates:
33-24-54N, 117-37-36W
33-23-22N, 117-36-02W
33-22-48N, 117-36-52W
33-24-31N, 117-38-20W.
The derrick barge LONG BEACH, deck barges, and additional white mooring buoys will be placed in the above area. Mooring buoys will be equipped with flashing white lights. D/B LONG BEACH will monitor VHF-FM channel 79a. Tugs LARCONA and PATCONA will be monitoring VHF-FM channels 79a and 16. Mariners are advised to avoid this area if possible or transit with due caution because of the multiple hazards associated with this

SOUTHERN CALIFORNIA-CONSTRUCTION-SAN CLEMENTE, CA

project. For more details or comments contact Ron Allard at 562-577-0814

Chart 18774 LNM: 23/08

SOUTHERN CALIFORNIA-DREDGING-NEWPORT BAY-Updated 05/13/08

DD-M is dredging from the PCH Bridge to Hotdog Tern Island.Dredging operations will be twenty-four hours a day; Monday through Saturday, except federal holidays, until 30 September 2008. The dredge CB3 will perform the dredging using tugs CLEO BRUSCO and ROLAND BRUSCO for assistance and towing. All dredging vessels will monitor VHF-FM Ch. 13, 14, 16, & 82. The primary disposal site for this project is a circle with a radius of 305 meters and center point at: 33-31-00N, 117-53-30W. A temporary scow mooring site has been established in the Lower Bay adjacent to Harbor Island at approximately 33-36-40N, 117-54-23W. Mariners are advised to use caution and transit at no wake speeds after passing arrangements have been made. Mariners are also advised that California Department of Fish and Game has closed the Upper Bay to boaters and kayakers Monday through Saturday upstream of the spill barge. For more details or comments contact Andrew Hunt at 415-847-6640.

Chart 18754 LNM: 06/08

SOUTHERN CALIFORNIA-DREDGING-VENTURA HARBOR

Camenzind Dredging Inc. will be dredging in the Ventura harbor in approximate position: 34-14-42N, 119-15-30W, 0700 to 1900 26 May 2008 to 10 Aug 2008. Floating and submerged pipeline will be marked with yellow floats; anchors marked with white buoys. Dredge PAUL VINCENT and work boat FESTER will monitor VHF- FM channel 16 and 67. Mariners are advised to use extreme caution while transiting this area. For more details or comments contact: Kurt Camenzind at 650-424-0367.

Chart 18725 LNM: 30/08

SOUTHERN CALIFORNIA-FIREWORKS-SAN DIEGO

San Diego Symphony Orchestra and Copley Symphony Hall will sponsor 15 firework demonstrations from 2100 to 2200 on 1, 2, 3, 8, 9, 10, 15, 16, 21, 22, 23, 28, 29, 30, and 31 August 2008 originating from an anchored barge at approximately: 32-42-12 N, 117-10-01 W. A 450 foot safety zone will be in effect encompassing the navigable waters around the pyrotechnics barge for the duration of the event. All mariners are to avoid the safety zone and use due caution when transiting outside this area. For more details or comments contact Kari Felten at 619-938-8277.

Chart 18773 LNM: 31/08

SOUTHERN CALIFORNIA-FIREWORKS-SAN DIEGO

Access Destination Services ESRI will sponsor a fireworks demonstration from 2130 to 2200 on 7 August 2008 originating from an anchored barge at approximately: 32-42-17 N, 117-10-04 W. A 500 foot safety zone will be in effect encompassing the navigable waters around the pyrotechnics barge for the duration of the event. All mariners are to avoid the safety zone and use due caution when transiting outside this area. For more details or comments contact Kari Felten at 619-938-8277.

Chart 18773 LNM: 32/08

SOUTHERN CALIFORNIA-FIREWORKS-SAN DIEGO

PRA Destination Management will sponsor a fireworks demonstration from 2115 to 2200 on 11 August 2008 originating from the flight deck of the USS Midway at approximately: 32-42-50 N, 117-10-30 W. A 300 foot safety zone will be in effect encompassing the navigable waters centered on the above coordinates for the duration of the event. All mariners are to avoid the safety zone and use due caution when transiting outside this area. For more details or comments contact Kari Felten at 619-938-8277.

Chart 18773 LNM: 32/08

SOUTHERN CALIFORNIA-GPS TESTING-CHINA LAKE TEST RANGE

The GPS navigation signal may be unreliable from 1 April 2008 through 30 September 2008 due to interference testing on GPS frequencies used in shipboard navigation and handheld systems. Electronic systems that rely on GPS, such as E-911, AIS and DSC, may be affected within a 167nm radius of position 35-56-52.400N, 117-34-35.400W. During this period, GPS users are encouraged to report any service outages by calling 703-313-5900 or by using the GPS Report a Problem Worksheet at WWW.NAVCEN.USCG.GOV.

LNM: 15/08

SOUTHERN CALIFORNIA-HAZARDOUS OFFSHORE OPERATIONS-MEXICAN BORDER

The U. S. Navy will be conducting hazardous operations continuously until 01Sep 2008 in an area bounded by the following coordinates:
32-35.00N, 118-16-00W
32-35-00N, 117-40-00W
31-55-00N, 117-40-00W
31-55-00N, 118-25-00W
32-33-00N, 118-25-00W
thence to the origin.
Mariners are advised to avoid the above area. For more details or comment contact Anna Marie Welch at 619-545-1757.

Chart 18022 LNM: 31/08

SOUTHERN CALIFORNIA-MILITARY EXERCISE-CAMP PENDLETON

The U.S. Military will conduct a Joint Logistic Over The Shore Exercise from 25 JUNE 2008 to 23 AUG 2008 in an area bound by the following coordinates:
033-18-34.17 N, 117-29-02.61 W
033-17-09.60 N, 117-32-05.04 W
033-14-03.58 N, 117-28-53.78 W
033-15-14.15 N, 117-26-12.69 W.

SOUTHERN CALIFORNIA-MILITARY EXERCISE-CAMP PENDLETON

Multiple military vessels will be anchored in this vicinity during this exercise. All vessels will monitor VHF-FM channel 79. Mariners are advised to stay clear of this area. See Enclosures for complete information regarding this exercise. For more details or comment contact LCDR George Morrill at 619-977-2882.

Chart 18740 LNM: 25/08

SOUTHERN CALIFORNIA-NAVAL OPERATIONS-SAN DIEGO

The U.S. Navy research platform FLIP (FLoating Instrument Platform) will be conducting sea trials in the Southern California area west of San Diego from 1200, Tuesday, 12 August until 1800, Wednesday, 13 August 2008. FLIP will be operating in the vertical position with a draft of 300 feet with 55 feet of structure above the waterline. FLIP will begin drifting in the vicinity of 32-55N, 117-30W and drift to the south. FLIP will maintain a continuous RADAR and visual watch and will monitor VHF-FM channel 16 and will be escorted by the tug NORTHERN MARINER. FLIP will be unable to maneuver while drifting. Request all vessels give FLIP a wide berth. For more details or comments contact Captain W.A. Gaines at 858-534-1797.

Chart 18765 LNM: 32/08

SOUTHERN CALIFORNIA-NOAA BUOYS-WEST OF SAN DIEGO

NOAA has temporarily established three buoy stations approximately 190 NM west of San Diego, CA in the following locations:
46090 (NO LLNR) 32-51-19N 120-42-06W
46290 (NO LLNR) 32-38-19N 120-37-26W
46490 (NO LLNR) 32-25-30N 120-32-12W.
The buoys are 2.3 meter disc, yellow hulls, identified by the numbers shown above and displaying a FL (4) Y 20S characteristics. Buoys are anticipated to be on station for approximately three months. Mariners are advised to use caution when transiting this area. For more details or comments contact CWO3 Fountain 228-688-1743.

Chart 18740 LNM: 30/08

SOUTHERN CALIFORNIA-SHOALING-ANAHEIM BAY, SEAL BEACH

A hydrographic survey of Seal Beach was conducted by the Army Corps of Engineers in July 2007. There is indication of shoaling on the eastern side of the channel from the pier head to approx 100 yds out and up to the Line of Demarcation. It is recommended that all ships entering Seal Beach stay approx 50-75 ft left of the channel centerline until through the Line of Demarcation. See enclosures for a chartlet of the area. For more details or comments, contact QMC(SW) Dan Kenley at 619-556-1442

Chart 18746 LNM: 40/07

SOUTHERN CALIFORNIA-SHOALING-SAN DIEGO

Shoaling has been reported in the San Diego Harbor Approach in the vicinity of coordinates:
32-39-00N, 117-13-00W.
All mariners are urged to use caution when transiting the area. See enclosures for the charted position and depths.

Chart 18772 LNM: 15/08

SOUTHERN CALIFORNIA-SURVEY OPERATIONS-OXNARD

Fugro West will be conducting sonar clearance surveys from 11 Aug through 8 Sep 2008, south of the Santa Clara River, with the approximate center of the survey area at 34-12-12N, 119-17-06W. The survey area will extend 2NM from shore and 4NM south. The M/V JULIE ANN will be monitoring VHF-FM ch. 16 & 14. Mariners are advised to use caution when transiting the area. For more details or comments contact Jeff Carothers at 805-650-7000.

Chart 18725 LNM: 32/08

SOUTHERN CALIFORNIA-SURVEY-POINT CONCEPTION TO THOUSAND OAKS

Fugro Pelagos, Inc. will conduct a Multi Beam Echo Sounder survey from 22 July 2008 to 15 August 2008 in the following areas:
Point Conception
Santa Barbara
Thousand Oaks.
The F/V QUICKSILVER will monitor VHF-FM channel 16. See the Enclosures section of this notice for a chartlet and Latitude and Longitude for the survey areas. For more details or comment contact James Hailstones at 858-945-2760

Chart 18720 LNM: 30/08

SECTION VIII - LIGHT LIST CORRECTIONS

An Asterisk *, indicates the column in which a correction has been made to new information

(1) No.	(2) Name and Location	(3) Position	(4) Characteristic	(5) Height	(6) Range	(7) Structure	(8) Remarks	
83	*Scripps Waverider Lighted Buoy 067*	33-13-17.000N 119-52-55.000W	Fl (5)Y 20s *			Yellow sphere with whip antenna.	Private aid. *	32/08
84	*Scripps Waverider Lighted Buoy Station 167*	33-24-08.760N 119-27-59.820W	Fl (5)Y 20s			Yellow sphere with whip antenna. *	Private aid. *	32/08

(1) No.	(2) Name and Location	(3) Position	(4) Characteristic	(5) Height	(6) Range	(7) Structure	(8) Remarks	
203	PLATFORM HARVEST LIGHT	34-28-09.198N 120-40-57.156W	Fl W 6s	60	9		RACON: M (--).	32/08
290	* Point Pinos Light	36-38-00.153N 121-56-01.378W	Oc W 4s	89	17		Emergency light of reduced intensity when main light is extinguished.	32/08
305 4110	Santa Cruz Light	36-57-05.306N 122-01-36.153W	Fl W 5s	60	* 16 W	White lantern house on square brick tower attached to brick building. 39	Light obscured from 085° to 220°.	32/08
335	Point Montara Light	37-32-11.312N 122-31-09.392W	Fl W 5s	70	* 16	White conical tower. 30	Emergency light of reduced intensity when main light is extinguished.	32/08
375	*San Francisco North Traffic Lane Lighted Bell Buoy N*	37-48-02.000N 122-47-55.000W	Fl Y 4s		* 6	Yellow.		32/08
470	Shelter Cove Entrance Bell Buoy 1	40-00-34.418N 124-03-35.407W				Green.	*	32/08
3009.1	PIER J BREAKWATER FRONT RANGE LIGHT	33-44-13.924N 118-11-41.659W	Iso G 6s	59		On building.	* Lighted 24 hours. Private aid.	32/08
3009.2	PIER J BREAKWATER REAR RANGE LIGHT	33-44-13.928N 118-11-46.679W	Iso G 6s	* 74		* On tower.	Lighted 24 hours. Private aid.	32/08
4110 305	Santa Cruz Light	36-57-05.306N 122-01-36.153W	Fl W 5s	* 60	16 W	* White lantern house on square brick tower attached to brick building. 39	Light obscured from 085° to 220°.	32/08
4665	Oakland Inner Harbor Lighted Buoy 5				*		Remove from list. *	32/08

PUBLICATION CORRECTIONS

NOS PUBLICATION

The National Ocean Service quarterly publication listing the most recent editions of nautical charts, miscellaneous maps, navigational publications, and weather with brief descriptions and up-to-date prices may be obtained from the following sources:
National Aeronautical Charting Office, AVN-530,
Federal Aviation Administration
6303 Ivy Lane, Suite 400
Greenbelt MD, 20770-1479
800-638-8972
http://chartmaker.ncd.noaa.gov/mcd/dole.htm.
Or from your local authorized nautical chart sales agent.

ENCLOSURES

SOUTHERN CALIFORNIA-MILITARY EXERCISE-CAMP PENDLETON

12JUN08 UPDATED MARINER MESSAGE (3).pdf

See link above for information.

LNM: 25/08

NORTHERN CALIFORNIA-BERKELEY MARINA-SAN FRANCISCO BAY

Berkeley_Shoaling.pdf

See link above for chartlet of shoaled area. Number of pages 1

LNM: 09/06

NORTHERN CALIFORNIA-SHOALING-CRESCENT CITY

Crescent City.pdf

See link above for chartlet of Crescent City Harbor shoaling.

Chart 18603

LNM: 23/08

TRANSPORTATION WORKER IDENTIFICATION CREDENTIAL (TWIC)

TWICLNM (2).doc

See link for TWIC information.

LNM: 32/08

SOUTHERN CALIFORNIA-SHOALING-ANAHEIM BAY, SEAL BEACH

Anaheim Bay July 2007 survey.pdf

See link above for shoaled area. Number of pages 1

Chart 18746

LNM: 40/07

SOUTHERN CALIFORNIA-SHOALING-SAN DIEGO

shoaling.pdf

See link above.

LNM: 15/08

SOUTHERN CALIFORNIA-SURVEY-POINT CONCEPTION TO THOUSAND OAKS

NoticeToMariners (2).jpg Notice to Mariners - SouthernCA.doc

See link above for details. 03 pages

Chart 18720

LNM: 30/08

REPORT OF DELAY AT DRAWBRIDGE

DelayRept0207.pdf

Use link above to Report a Delay at a Drawbridge

LNM: 06/07

THE LOCAL NOTICE TO MARINERS IS AVAILABLE ON THE WORLD WIDE WEB AT WWW.NAVCEN.USCG.GOV/LNM/D11/.

M. L. VANHOUTEN
U.S. Coast Guard
Acting, Chief, Waterways Management Branch

U.S. COAST GUARD
REPORT OF DELAY AT DRAWBRIDGE
PER 33 CFR 117.5

BRIDGE NAME____ DATE ______________________

MILE _______________ WATERWAY ____

1. Name/ Type of Vessel ______________________________ Direction of Travel __________________
2. Vessel Owner (Name) ____

   (Address) ____
3. Name of Pilot (if applicable) ____

   (Address) ____
4. Time vessel signaled for bridge opening ____
5. Location of vessel when signal was given ____
6. Time and location of vessel when delay began ____
7. Method of signal for bridge opening ( ) Radio ( ) Sound ( ) Visual

   (If sound or visual signal was used, specify ____)
8. Time bridge operator acknowledged signal ____
9. Method of bridge operator acknowledgement ( ) Radio ( ) Sound ( ) Visual

   (If sound or visual signal was used, specify ____)
10. Did bridge operator acknowledgement indicate the bridge
    ( ) Could be opened immediately
    ( ) Could not be opened immediately

11. If land traffic crossed the bridge:

    Time land traffic started across the bridge ____

    Time land traffic stopped crossing the bridge ____

    Did land traffic stop on the bridge? ____

    Duration land traffic stopped on the bridge ____
12. Time drawbridge opened for navigation ____

14. Additional comments ____

____

____

____

I certify the above information is true to the best of my knowledge and understand this statement may be used by the U.S. Coast Guard in levying fines against the bridge owner.

Signature ______________________________________

Telephone ______________________________________

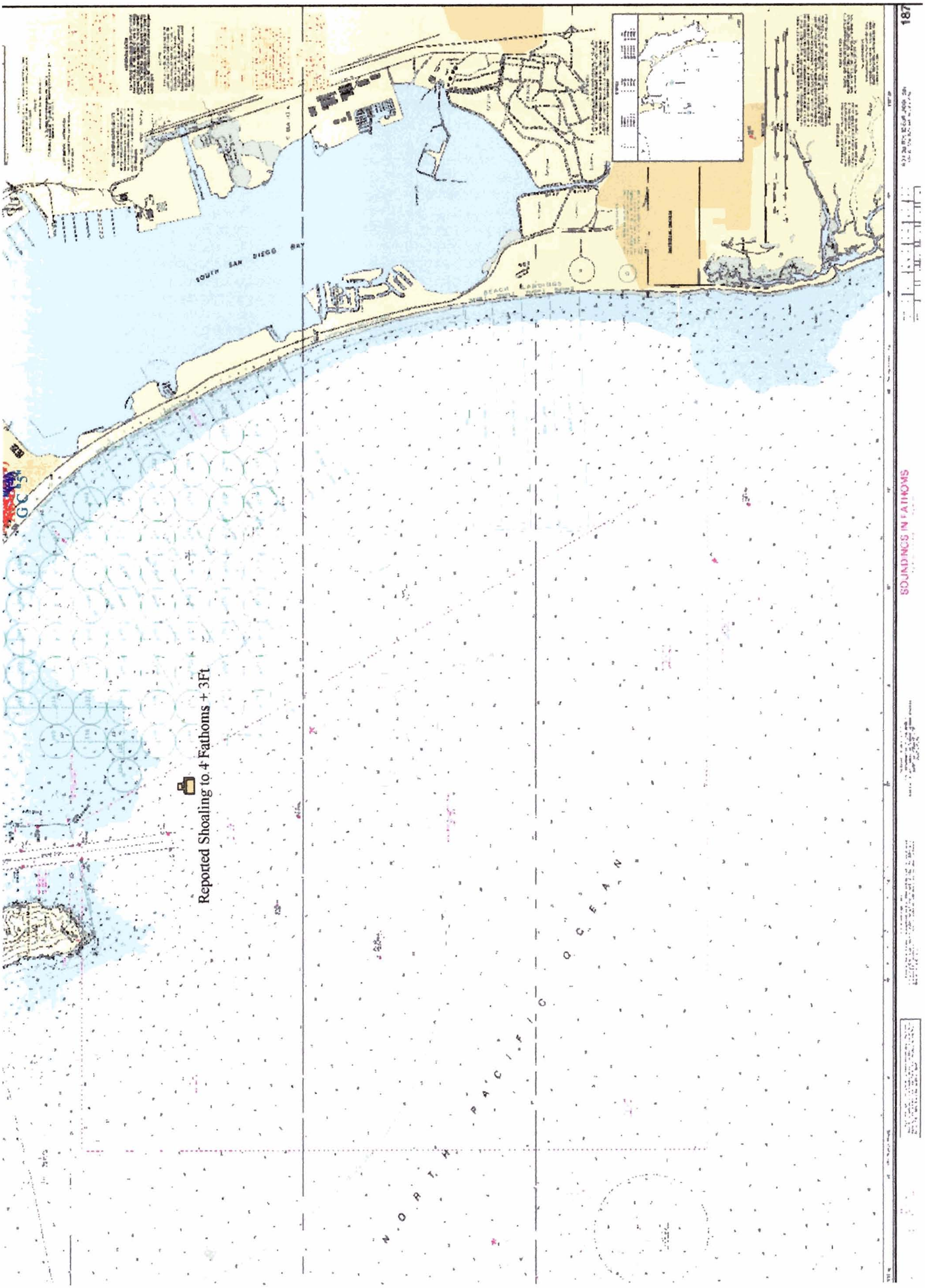
Mariners may complete and send via fax or mail to:

USCG D11(dpw) Bridge Administration
Building 50-2
Coast Guard Island
Alameda, CA 94501-5100
Cellular: (510) 219-4366, Work Phone: (510) 437-3516
Work Fax: (510) 437-5836

Mariners are reminded not to require bridge openings for appurtenances nonessential to navigation, per 33 CFR 117.11

117° 15' 0" W

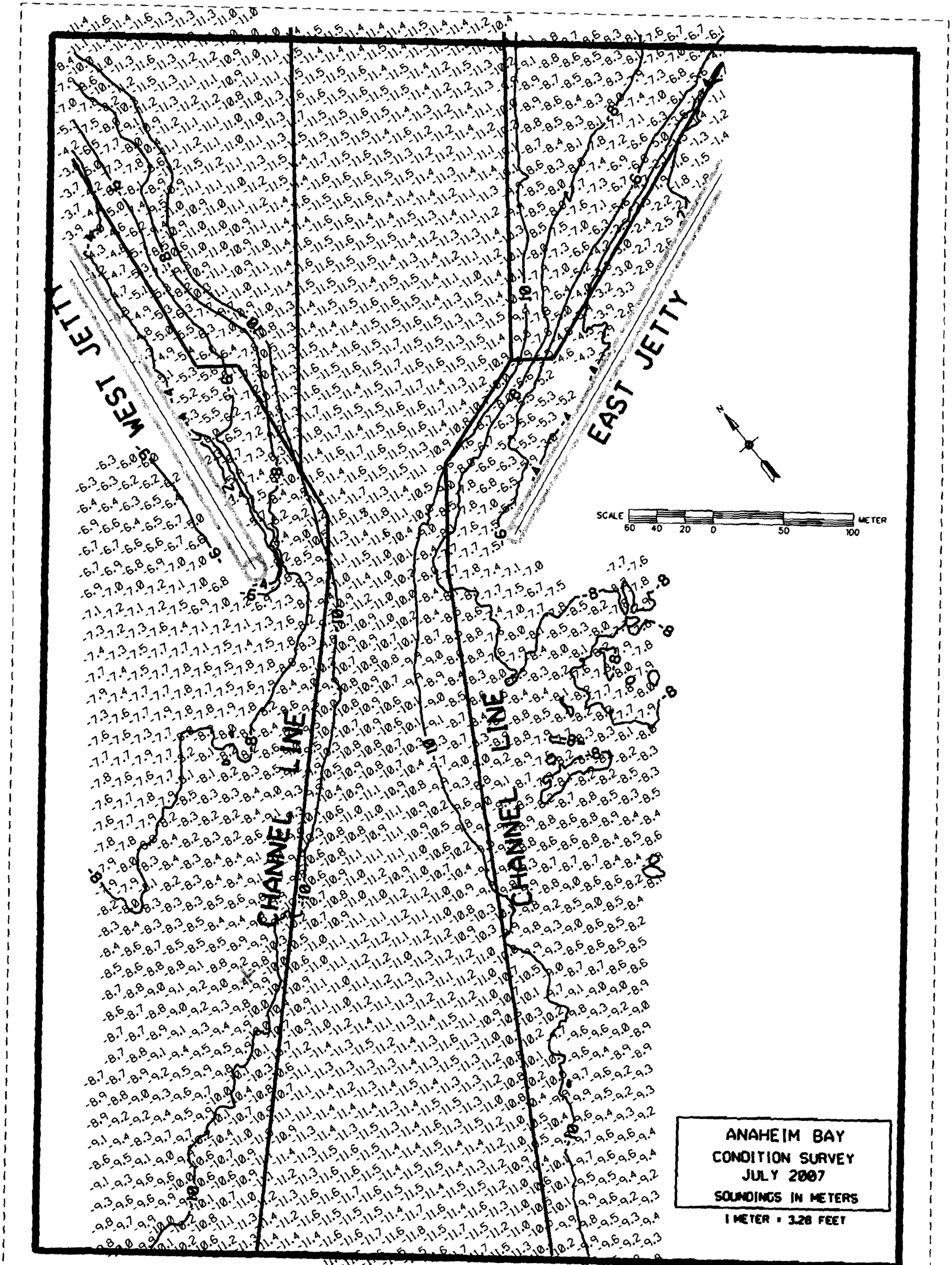
117° 18' 0" W



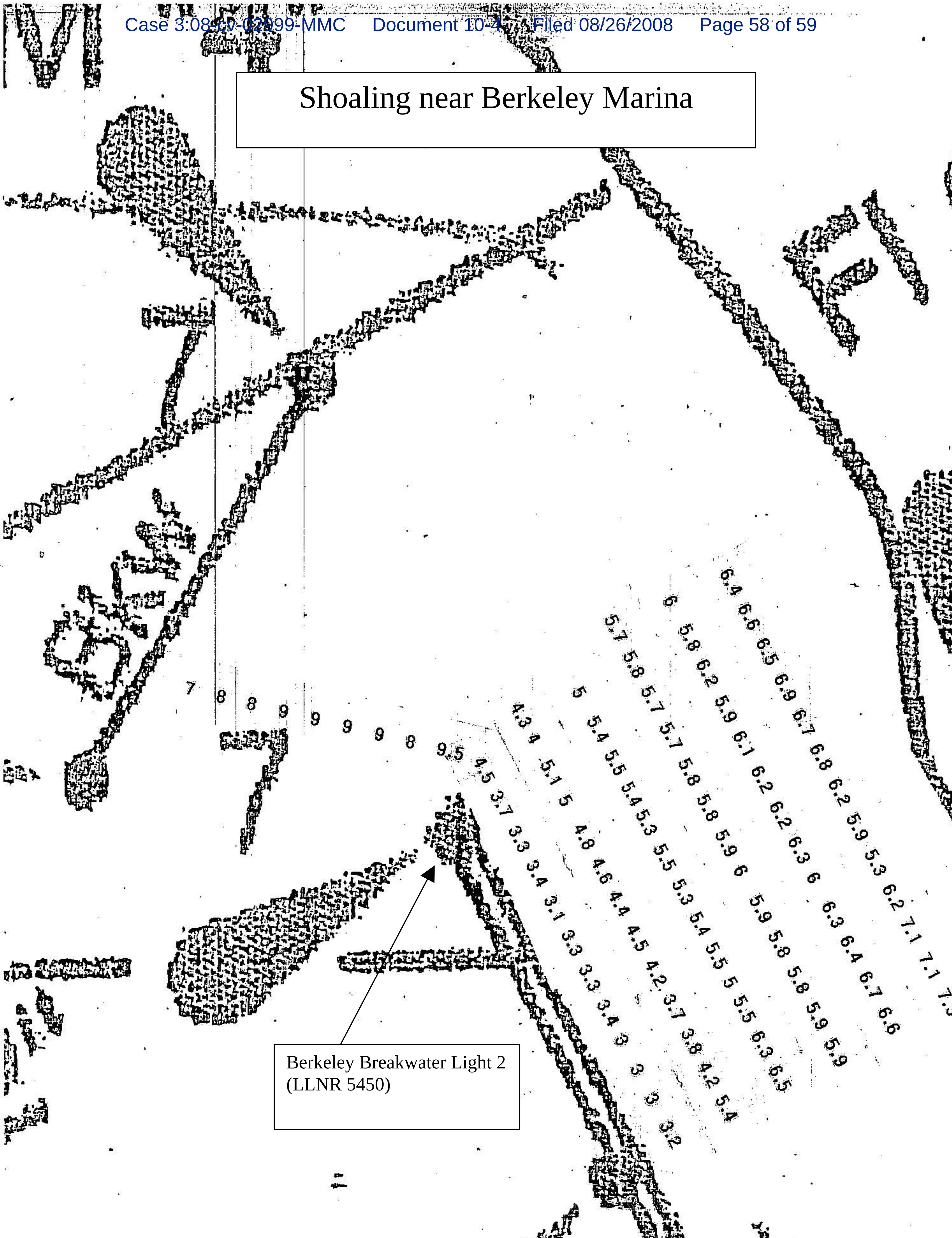
117° 15' 0" W

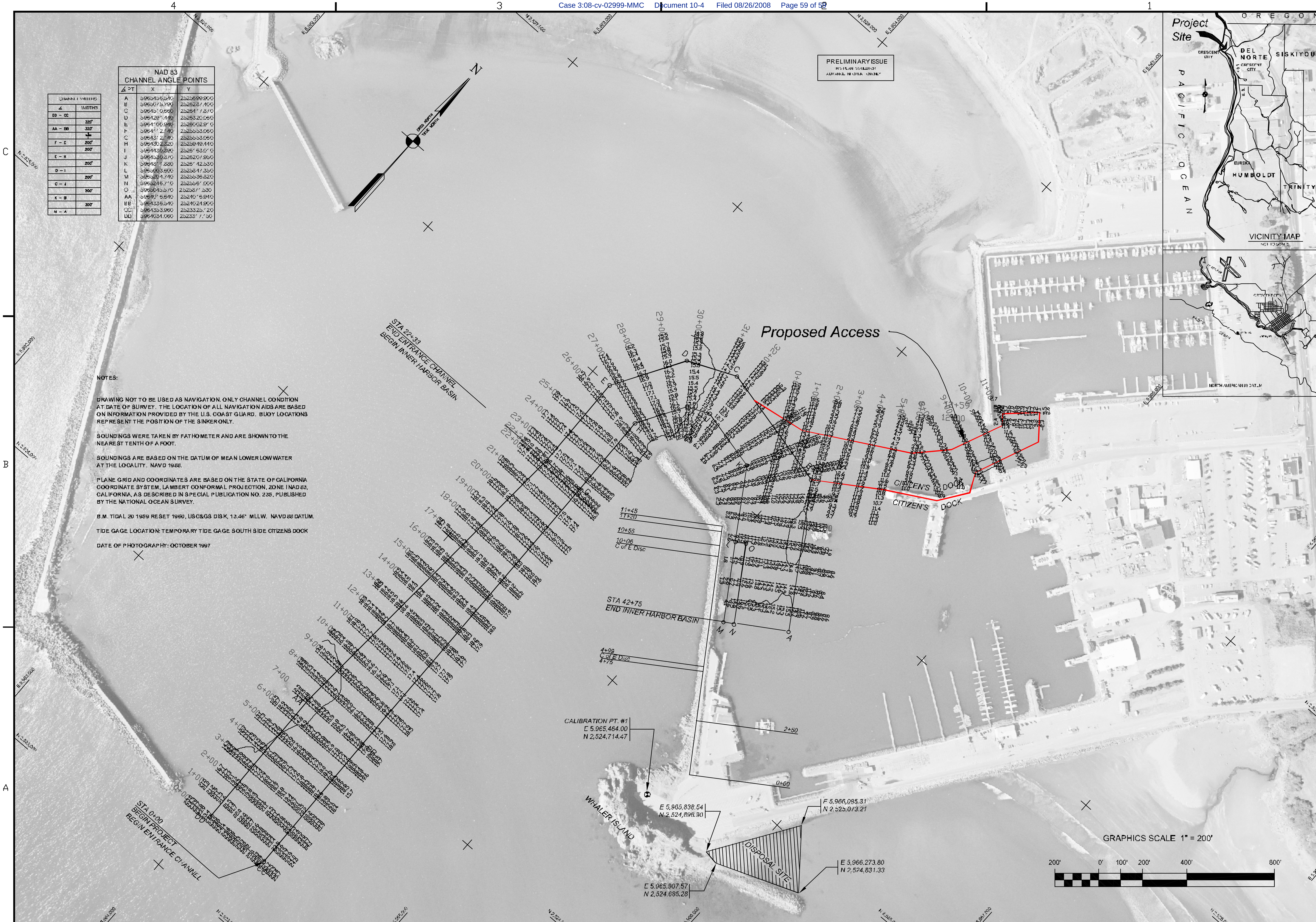
117° 18' 0" W

Chart Name: APPROACHES TO SAN DIEGO BAY
Chart ID: 18772_1
Top Left: 32° 40' 35" N 117° 18' 5" W
Bottom Right: 32° 32' 40" N 117° 5' 2" W


WEST JETTY
EAST JETTY
CHANNEL LINE
CHANNEL LINE
N
SCALE
60 40 20 0 50 100
METER
ANAHEIM BAY
CONDITION SURVEY
JULY 2007
SOUNDINGS IN METERS
1 METER = 3.28 FEET

Shoaling near Berkeley Marina





US Army Corps of Engineers
San Francisco District
1455 Market Street
San Francisco, CA 94103

Mark	Description	Date	Appr.

DESIGNED BY: | CHECKED BY: TVW | DRAWN BY: EWC
DATED: 3/27/2008 | SHEET NO. 1 OF 1 | DRAWING NO. 8 2 96

PREPARED UNDER THE DIRECTION OF
CRAIG W. KILEY
LT. COLONEL, C.E., DISTRICT ENGINEER

SUBMITTED: MC

DEL NORTE COUNTY CALIFORNIA

CRESCENT CITY
CONDITION SURVEY
16-17 MARCH 2008

Sheet reference number
C1